









METEOROLOGICAL SERVICE, DOMINION OF CANADA.

Monthly Weather Review.

JANUARY, 1891.

INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraphic reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief Signal Officer, Washington, D. C.

ATMOSPHERIC PRESSURE.

The average pressure, as determined from the observations taken at telegraph reporting stations, was about normal, except in the Northwest Territories, where it was rather more than a tenth of an inch below normal.

January was chiefly noticeable for the exceptionally mild weather which prevailed in the Western Territories for the greater portion of the month, more especially in Alberta and Assiniboia; also for a heavy gale which occurred on the 12th over the Maritime Provinces, accompanied by remarkably high tides.

An important and extensive cyclone covered the Middle States, and extended over the whole Lake District at the commencement of the month. It moved in a northeasterly direction and caused a general fall of rain turning to snow in Ontario and the Maritime Provinces, and a general snowfall over Quebec. It was accompanied by high winds throughout the Lake District and Eastern Canada.

On the 3rd a general fall in temperature and clearing anti-cyclonic weather spread over the whole country from the Lakes to the Atlantic.

A cyclone, which first appeared off Cape Hatteras on the 4th, moved up the coast with increasing energy, and caused a fresh gale and snowfall during the 5th and 6th in the Maritime Provinces, and a light snowfall in the St. Lawrence Valley. It dispersed over Eastern Canada on the 7th, and anti-cyclonic conditions and fine weather, which had continued elsewhere, now extended over the east, and a period of fine cold weather was experienced everywhere till the 11th.

In the Western Territories the pressure changes were unimportant, moderate cyclones and anti-cyclones quickly alternating. Light snow fell in Alberta and Assiniboia on the 16th and 17th, and in Manitoba on the latter day. Although there were a few nights on which the temperature was low, it was as a rule exceptionally high throughout the Territories, with generally fair weather until the 12th.

During the 11th a general decrease in pressure took place over the Lakes and Mississippi Valley, and an important depression formed over the Middle States, which moving northeastward soon became an important storm. There was a moderate fall of snow over Southern Ontario, and a more general and heavy fall of snow in Quebec and rain in the Maritime Provinces.

A strong gale from easterly shifting to westerly was experienced throughout Eastern Canada, and exceptionally high tides along the coast were reported.

A short period of fair, colder weather followed over the Lakes and the east.

During the 12th an important cyclone appeared over the Western Territories, accompanied by high temperatures, light local falls of snow or rain and a fresh gale from the S. veering to S.W.; from thence it took a S.E. course and was over the Lakes on the 13th, causing a general but light fall of snow; from the Lakes it passed eastward and dispersed, a light fall of snow being general in Eastern Canada.

On the 15th an anti-cyclonic period set in with N.E. and N.W. winds, and there was a general fall in temperature throughout Ontario and Quebec, which was soon after felt in the Maritime Provinces. Fair, cold weather and high-pressure continued till the 18th, when a slight depression over the Lakes caused a rise in temperature and light snow.

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The outer limits of a cyclone, central off the Nova Scotian coast, also caused a heavy fall of rain and higher temperatures in Nova Scotia and some snow in New Brunswick. A recovery in pressure followed, with moderate temperatures everywhere till the 20th.

Colder and anti-cyclonic weather spread over the Western Territories on the 14th, and there was a light snowfall over the southern portion. A cyclone caused light snow in Manitoba on the 16th, but did not otherwise affect the Territories. A marked rise of temperature followed on the 17th, temperatures between 40° and 50° being recorded in Alberta and Assiniboia. The change, however, was less marked in Manitoba. On the 19th mild weather extended over the whole Territories and continued till the 21st.

On the 20th a slight depression, which passed over the Western Territories, developed when over the Lakes, and on the 21st another cyclone appeared over the Lower Mississippi Valley, a trough of low pressure then extending from the Lakes to the Gulf of Mexico; rain fell in the western portion of Ontario and light snow in Western Quebec. Next day the two cyclones coalesced, the centre in the morning being over Pennsylvania. A marked development then took place, strong winds and moderate gales and light snow prevailed over the Lakes and a general S.E. to S.W. gale, with rain, was general throughout Eastern Canada. The cyclone moved quickly N.E. across the country to Labrador, where it was centered on the 23rd, on which day fairer weather set in everywhere and continued till the 25th, when a cyclone, which first appeared over the Gulf of Mexico on the 23rd and had taken a N.E. course, was over the Maritime Provinces, where it caused a fresh N.E. to N.W. gale and a snow storm.

A small depression over the Lakes gave a moderate fall of snow on the 25th in Ontario, and then dispersed. Another slight depression, over this district, also caused a light fall of snow on the 27th; and another off the Nova Scotian Coast gave light snow in the Maritime Provinces on the same day; elsewhere the weather was generally fair.

A cyclone from the S.W. States covered the Lake District on the 29th, causing a rise of temperature and a general rainfall in Ontario, which conditions were soon transferred to Quebec and the Maritime Provinces. Fair weather for a short time followed, but on the 31st rain again set in over the Lake District, owing to the approach of a cyclone from the west.

Somewhat lower but moderate temperatures continued after the 20th in the Western Territories, more especially in Alberta and Assiniboia, with generally fair weather and no marked change in pressure till the 30th, when a well defined cyclone crossed the territories, giving light snow in most places. This was followed by an important anti-cyclone from the north, which brought a change to decidedly cold weather throughout this part of the country, and was accompanied by light snow in Alberta and Assiniboia.

TEMPERATURE.

The average temperature, as determined from the observations taken at telegraph reporting stations, was everywhere above the normal of seventeen years. In the older Provinces the greatest excess was $5^{\circ}8$ at Charlottetown, P.E.I., but in Winnipeg it was $14^{\circ}4$, and in the Northwest it was more than 20° at several stations.

The highest and lowest temperatures in each Province during January were: British Columbia, $57^{\circ}0$ on 19th at Maple Grove; $-16^{\circ}0$ on 31st at Barkerville. Northwest Territories, $56^{\circ}9$ on 20th at Calgary; $-34^{\circ}9$ on 15th at Prince Albert. Manitoba, $45^{\circ}0$ on 19th at Hillview and Fort Ellice; $-32^{\circ}0$ on 15th at Oak Bank and Posen. Ontario, $53^{\circ}0$ on 1st at Stoney Creek; $-44^{\circ}3$ on 16th at White River. Quebec, $45^{\circ}0$ on 2nd at Huntingdon and Brome; $-43^{\circ}0$ on 14th at Chicoutimi. New Brunswick, $48^{\circ}8$ on 12th at Fredericton; $-21^{\circ}5$ on 17th at Dalhousie. Nova Scotia, $54^{\circ}0$ on 12th at Yarmouth; $-13^{\circ}5$ on 27th at Truro. Prince Edward Island, $48^{\circ}0$ on 18th at Georgetown; $-16^{\circ}4$ on 17th at Kilmahumnaig.

Thunder and lightning recorded on the 29th at several stations in Southwestern and Central Ontario.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, JANUARY, 1891.

STATION.	PRESSURE IN INCHES.				TEMPERATURE OF AIR.				TEMPERATURE OF WATER.				WIND.				PRECIPITATION.			
	Mean actual.		Mean reduced.		Highest.	Lowest.	Range.	Mean.	Diff. from aver.	Age.	Years observ.	Highest.	Lowest.	Range.	Mean.	Diff. from aver.	Age.	Years observ.		
	in.	in.	in.	in.															in.	in.
ASSTORIA:																				
Medicine Hat	30.11	30.70	29.56	1.14	24.6	23.1	7.53-7	20	-13.8	31	25.1-44.0	.....	.....	.....	.....	.....	.....	.....
Edmonton	30.00	30.84	29.48	1.36	18.5	20.8	8.49-0	12	-29.5	30	19.9-39.0	.....	.....	.....	.....	.....	.....	.....
Phoenix Forks	.....	.....	.....	.....	7.6	20.5	6.49-0	19	-30.0	15	.....	.....	.....	.....	.....	.....	.....	.....
Maple Creek	.....	.....	.....	.....	27.7	30.4	6.53-0	20	-25.0	30	.....	.....	.....	.....	.....	.....	.....	.....
Swift Current	30.13	30.75	29.61	1.14	19.2	16.2	5.46-0	18	-25.0	31	19.5-35.0	.....	.....	.....	.....	.....	.....	.....
Qu'Appelle	30.03	30.67	29.41	1.26	14.5	21.9	7.41-8	19	-27.7	15	22.0-51.1	.....	.....	.....	.....	.....	.....	.....
Gleichen	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kilnap	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Regina	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gravelly	30.07	30.79	29.49	1.30	26.5	23.2	6.56-9	20	-20.0	31	25.1-50.9	.....	.....	.....	.....	.....	.....	.....
Calgary	.....	.....	.....	.....	22.7	28.2	6.51-0	4	-5.0	13	.....	.....	.....	.....	.....	.....	.....	.....
Chaplin	30.07	30.76	29.45	1.31	4.9	.....	4.5-5	19	-34.9	15	23.9-61.2	.....	.....	.....	.....	.....	.....	.....
Prince Albert	.....	.....	.....	.....	20.9	16.5	3.40-0	18	-23.1	31	18.7-35.9	.....	.....	.....	.....	.....	.....	.....
Band	.....	.....	.....	.....	11.4	.....	43-0	19	-29.6	14	22.8-51.0	.....	.....	.....	.....	.....	.....	.....
Cochran	.....	.....	.....	.....	16.3	.....	50-0	20	-25.0	15	23.4-42.0	.....	.....	.....	.....	.....	.....	.....
Glen Adelaide	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
MONTANA:																				
Minidosa	30.08	30.69	29.50	1.19	9.0	19.8	8.37-9	20	-29.5	15	21.2-41.2	.....	.....	.....	.....	.....	.....	.....
Winnipeg	30.11	30.71	29.41	1.30	7.2	14.4	17.33-5	20	-30.2	13	17.9-37.8	.....	.....	.....	.....	.....	.....	.....
Prudhomme	.....	.....	.....	.....	11.9	26.4	5.45-0	19	-28.0	31	.....	.....	.....	.....	.....	.....	.....	.....
Hillview	.....	.....	.....	.....	7.4	14.4	13.31-7	19	-31.2	15	17.8-33.5	.....	.....	.....	.....	.....	.....	.....
Stony Mountain	30.01	30.78	29.52	1.26	8.5	22.1	7.40-0	19	-30.0	15	20.6-37.0	.....	.....	.....	.....	.....	.....	.....
Russell	.....	.....	.....	.....	11.5	20.9	5.44-5	19	-29.5	31	21.2-51.5	.....	.....	.....	.....	.....	.....	.....
St. Albans	.....	.....	.....	.....	6.1	12.2	4.26-0	28	-30.0	31	.....	.....	.....	.....	.....	.....	.....	.....
Fort Osborne	.....	.....	.....	.....	7.1	.....	30-0	26	-32.0	15	15.4-31.0	.....	.....	.....	.....	.....	.....	.....
Oak Bank	.....	.....	.....	.....	11.9	16.0	2.45-0	19	-24.0	31	20.6-51.0	.....	.....	.....	.....	.....	.....	.....
Fort Ellice	.....	.....	.....	.....	7.1	19.4	1.35-0	20	-32.0	15	19.3-50.0	.....	.....	.....	.....	.....	.....	.....
Poseidon	.....	.....	.....	.....	11.9	21.6	3.42-0	19	-32.0	31	22.3-43.7	.....	.....	.....	.....	.....	.....	.....
Brandon	.....	.....	.....	.....	.....	.....	42-0	19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fortage la Prairie	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
ONTARIO:																				
Burlington	30.06	30.72	29.50	1.22	10.6	10.5	3.34-0	11	-32.0	2	.....	.....	.....	.....	.....	.....	.....	.....
Saxatone	.....	.....	.....	.....	6.4	11.3	5.35-0	30	-29.0	14	.....	.....	.....	.....	.....	.....	.....	.....
North Bay	.....	.....	.....	.....	8.8	4.8	3.32-0	31	-37.0	16	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	9.5	6.5	3.35-0	24	-30.0	16	19.1-46.0	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	1.1	.....	23-0	30	-21.0	17	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	5.7	9.2	3.25-0	29	-28.0	15	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	8.6	9.6	4.35-0	21	-37.0	16	.....	.....	.....	.....	.....	.....	.....	.....
.....	30.13	30.84	29.61	1.23	5.9	11.0	4.35-0	10	-44.3	16	25.3-55.8	.....	.....	.....	.....	.....	.....	.....
.....		
.....	30.09	30.65	29.56	1.29	11.9	9.2	11.36-0	20	-22.0	16	22.0-39.0	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	15.8	1.7	16.37-5	21	-25.4	16	19.6-43.5	.....	.....	.....	.....	.....	.....	.....
.....	30.06	30.72	29.50	1.23	22.6	2.1	17.42-0	30	-3.0	16	11.1-27.5	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	23.3	6.5	11.42-0	21	-6.0	17	12.98-31.0	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	13.1	6.1	3.36-1	22	-24.3	22	21.2-37.9	.....	.....	.....	.....	.....	.....	.....
.....	28.94	29.26	27.88	1.38	22.6	6.2	9.40-0	1	-7.0	16	13.6-26.0	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	20.4	5.8	11.39-0	2	-9.6	16	13.1-37.0	.....	.....	.....	.....	.....	.....	.....
.....		
.....	.....	.....	.....	.....	15.7	5.6	6.36-0	23	-30.6	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	16.9	5.9	7.28-0	28	-22.5	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	13.4	2.9	3.35-5	23	-25.0	16	20.2-39.9		

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION, &c.—Continued.

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STATIONS RECEIVED TOO LATE FOR THE DECEMBER REVIEW.

PROVINCE.	STATION.	MEAN TEMP.	HIGHEST TEMPERATURE.		LOWEST TEMPERATURE.		PRECIPITATION.		THUNDER STORMS ON	AURORAS ON
			Temp.	Date.	Temp.	Date.	Amount.	Days.		
		°	°		°		in.			
N. W. Territories	Pleasant Forks	8.87	36.0	28	-17.0	25		1		
	Badli	27.55	49.5	20	-3.4	5	0.94	7		
Ontario	Little Current	49.23	45.0	22	-14.0	28	1.55	6		1, 19.
	Coldwater	45.26	39.6	24	-15.6	8	3.04	14		
Quebec	Lakefield	26.81	37.0	22	-11.0	28	1.28	11		
	Pointe des Monts	7.52	25.0	4	-15.0	2	6.90	10		

PRECIPITATION.

The rainfall in general throughout the Dominion has exceeded the average by a small amount, except in Quebec and B. Columbia.

The distribution is as follows:—

In ONTARIO, West and South-West District, it was 1.59 in., or 0.03 in. above the average. In the North and North-West District it was 0.93 in., or 0.21 in. above the average. In the Central District it was 1.84 in., or 0.69 in. above the average, and in the East and North-East District it was 1.11 in., or 0.31 in. above the average.

In QUEBEC it was 0.36 in., or 0.13 in. below the average.

In NEW BRUNSWICK it was 2.95 in., or 1.43 in. above the average.

In NOVA SCOTIA it was 3.61 in., or 1.37 in. above the average.

In P. E. ISLAND it was 2.02 in., or 1.13 in. above the average.

In MANITOBA and the N. W. Territories very little rain has fallen, although the temperature was very considerably above the average.

In B. COLUMBIA it was (as far as heard from) 1.49 in., or 0.70 in. below the average.

Rainfall 5 in. and upwards during month.

B. COLUMBIA. Port Moody, 11.37 in.; Maple Grove, 7.47 in.; Esquimalt, 5.22 in.

N. BRUNSWICK. Grand Manan, 6.21 in.; St. John, 5.22 in.

NOVA SCOTIA. Halifax, 6.19 in.

Rainfall 1 in. and upwards in 24 hours.

1st, Saugeen, 1.27 in.; Parry Sound, 1.12 in.; London, 1.11 in.; Port Moody, 1.00 in.; Bognor, 1.06 in.; Owen Sound, 1.17 in.; Gravenhurst, 1.44 in.; Alton, 1.08 in.; Elora, 2.10 in.; DeCewsville, 1.04 in.; Norwood, 1.25 in.; Paris, 1.17 in.; Brantford, 1.23 in.; Zurich, 1.10 in.; Whiteside, 1.45 in.; Uplands, 1.10 in.; Sprucedale, 1.15 in.; Digby, 1.00 in.; North Bruce, 1.82 in.; Lucknow, 1.80 in.; Point Clark, 1.46 in.; Beatrice, 1.68 in.; Pelee Island, 1.70 in.; St. George, 1.14 in.; Port Hope, 1.00 in.; Scarboro', 1.00 in.; Orangeville, 1.22 in.; Glastonbury, 1.60 in.; Georgetown, 1.08 in.; Midland, 1.49 in.; Wyoming, 1.04 in.; Watford, 1.20 in.; Sunshine, 1.75 in.; Rosehill, 1.60 in.; Wiarton, 1.59 in.; Presqu'Isle, 2.00 in.; Nelson, 1.02 in.; Dea'town, 1.04 in.; Lions Head, 1.40 in.; Winona, 1.50 in.; Blenheim, 1.20 in.; Coldstream, 1.03 in.

2nd, Grand Manan, 1.15 in.; Yarmouth, 1.27 in.; Conestogo, 1.05 in.; Pictou, 1.00 in.; St. John, 1.66 in.

7th, St. Johns, Nfld., 1.39.

12th, Fredericton, 1.45 in.; Sydney, 1.08 in.; Halifax, 1.22 in.; Dorchester, 1.03 in.; Pictou, 1.00 in.; Port Hastings, 2.17 in.

13th, St. Johns, Nfld., 1.36 in.

18th, Port Hastings, 1.02 in.; Esquimalt, 1.33 in.; Grand Manan, 3.47 in.; Yarmouth, 1.21 in.; St. Andrew, 1.22 in.; Charlottetown, 1.12 in.; St. John, 1.74 in.; Halifax, 1.07 in.; Truro, 1.50 in.

Port Moody, 2.35 in.; Maple Grove, 1.07 in.; Point Lepreaux, 1.45 in.

19th, Port Moody 2.60 in.; Maple Grove, 1.30 in.

20th, Georgetown, P.E.I., 2.30 in.

22nd, Niagara Falls, S., 122 in. ; Dorchester, 147 in. ; Point Lepreaux, 132 in. ; Fredericton, 135 in.
25th, Port Moody, 100 in.

Snowfall in the same districts as in the rainfall.

ONTARIO.—8'00 in., or 8'7 in. below the average ; 16'4 in., or 9'2 in. below the average ; 13'2 in., or 2'2 in. below the average ; 18'1 in., or 1'3 below the average.

QUEBEC.—26'3 in., or 0'8 in. below the average.

N. BRUNSWICK.—33'6 in., or 9'4 in. above the average.

N. SCOTIA.—19'5 in., or 0'7 in. above the average.

P. E. ISLAND.—26'0 in., or 1'2 in. below the average.

MANITOBA.—5'9 in., or about one-half the average fall.

N. W. TERRITORIES.—4'0 in., or about one-half that of January, 1890.

B. COLUMBIA.—About 6 in. has fallen.

Snowfall 15 in. and upwards during month.

B. COLUMBIA.—Barkerville, 21 in.

MANITOBA.—Posen, 15'9 in.

ONTARIO.—Rockliffe, 31 in. ; Saugeen, 24 in. ; Kingston, 16 in. ; Parry Sound, 20 in. ; Durham, 24 in. ; Lindsay, 22 in. ; Ottawa, 23 in. ; Alexandria, 22 in. ; Coldwater, 21 in. ; Novar, 22 in. ; Cook's Mills, 16 in. ; Gravenhurst, 17 in. ; Bognor, 25 in. ; Mattawa, 19 in. ; Georgina, 17 in. ; Norwood, 17 in. ; Lakefield, 18 in. ; Beatrice, 24 in. ; Renfrew, 17 in. ; Bancroft, 21 in. ; Ignace, 30 in. ; Uplands, 17 in. ; Axe Lake, 16 in. ; Joly, 22 in. ; Sprucedale, 18 in. ; Sault St. Marie, 26 in. ; Clontarf, 34 in. ; Port Hope, 17 in. ; Barclay, 21 in. ; Peterboro', 19 in. ; Thompson, 19 in. ; Georgetown, 18 in. ; Midland, 15 in. ; Orillia, 19 in. ; Goderich, 18 in. ; Sunshine, 18 in. ; Presqu'Isle, 17 in. ; Denbigh, 26 in.

QUEBEC.—Father Point, 40 in. ; Quebec, 37 in. ; Cape Magdalen, 37 in. ; St. Hyacinthe, 23 in. ; Richmond, 25 in. ; Chicoutimi, 16 in. ; Montreal, 21 in.

N. BRUNSWICK.—Chatham, 36 in. ; Grand Manan, 21 in. ; St. John, 28 in. ; St. Andrews, 39 in. ; Dorchester, 36 in. ; Point Lepreaux, 28 in. ; Dalhousie, 30 in. ; Woodstock, 38 in. ; Point Escuminac, 45 in. ; Fredericton, 33 in.

NOVA SCOTIA.—Halifax, 22 in. ; Truro, 22 in. ; Pictou, 17 in. ; Cow Bay, 15 in.

P. E. ISLAND.—Charlottetown, 24 in. ; Georgetown, 15 in. ; Kilmahumaig, 39 in.

Snowfall 5 in. and upwards in 24 hours.

2nd, Father Point, 6 in. ; Pelee Island, 6 in.

3rd, Ignace, 11 in.

4th, Ignace, 5'5 in.

5th, Yarmouth, 6'4 in. ; St. John City, 9 in.

6th, Grand Manan, 5 in. ; St. Andrews, 7 in. ; Brome, 6 in. ; Point Escuminac, 5 in.

7th, Grand Manan, 7 in. ; Point Lepreaux, 14 in. ; Winona, 5 in. ; Fredericton, 5'5 in.

8th, Ignace, 6 in.

10th, Glastonbury, 12 in.

11th, Ottawa, 8 in. ; Alexandria, 7 in. ; Georgina, 6 in. ; Renfrew, 6 in. ; Clontarf, 6 in. ; Peterboro', 5'6 in. ; Oliver's Ferry, 5 in. ; Georgetown, 7'5 in. ; Rosehill, 8 in. ; Nelson, 5'2 in.

12th, Father Point, 11 in. ; Quebec, 10 in. ; Norwood, 6 in. ; Stoney Creek, 6 in. ; Lakefield, 6 in. ;

Paris, 5'5 in. ; Brantford, 5 in. ; Chicoutimi, 5 in. ; Denbigh, 5'5 in. ; Aurora, 5'5 in.

13th, Durham, 12 in. ; Little Forks, 6 in. ; Savanne, 5 in. ; Port Hope, 10 in. ; Thompson, 5 in.

14th, Durham, 12 in. ; Sault St. Marie, 6 in.

15th, Huntingdon, 6 in. ; Axe Lake, 6 in.

16th, St. Hyacinthe, 8 in.

18th, Chatham, 15'2 in. ; Woodstock, N.B., 20 in. ; Dalhousie, 10 in. ; Kilmahumaig, 14 in. ; Woodstock, 20 in. ; Fredericton, 5 in.

20th, Father Point, 5 in. ; Kilmahumaig, 6 in.

21st, Cape Magdalen, 8 in.

22nd, Quebec, 11 in. ; Clontarf, 8 in.

23rd, Durham, 5 in. ; Beatrice, 5 in. ; Denbigh, 5'5 in.

24th, Gravenhurst, 5 in. ; Pictou, 8 in. ; Presqu'Isle, 8 in.

25th, Sydney, 6 in. ; St. Andrews, 7'3 in. ; Charlottetown, 5'5 in. ; Halifax, 7'0 in. ; Truro, 7'5 in.

Point Clark, 6 in.; Dorchester, 8½ in.; Digby, 5 in.; Georgetown, P.E.I., 6 in.; Cow Bay, 7 in.
 20th, Norwood, 6 in.; Wallace, 7 in.
 27th, Point Lepreaux, 6 in.; Goderich, 5 in.
 28th, Thompson, 6 in.
 29th, Sault St. Marie, 6 in.; Peterboro', 10.
 30th, Charlottetown, 6½ in.; Dorchester, 7 in.; Point Escuminac, 10.

Aurora recorded on

The class of aurora, if noted by Observer, is given (I) being the brightest, (IV) the feeblest in brilliancy.

1st, Father Point, IV.
 7th, Little Forks, IV.
 9th, Swift Current, III; Egremont, IV; Savanne.
 10th, Port Arthur, II; Minnedosa, IV; Buda.
 11th, Minnedosa, IV.
 14th, St. Albans, IV.
 16th, Woodstock, N.B.; Buda.
 18th, Minnedosa, IV; Haliburton, IV; Gravenhurst, II; Cottam.
 19th, Prince Albert, IV.
 20th, Prince Albert, IV.
 25th, Savanne.
 26th, Paris.
 28th, Prince Albert, IV; Savanne; St. Albans, IV; Russell, IV.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE
 THE HORIZON IN THE MONTH OF JANUARY, 1891.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
WINNIPEG				0.05	0.22	0.28	0.32	0.30	0.32	0.26	0.23	0.05	0.00			..
.....																..
.....																..
KINGSVILLE				00	06	09	19	21	26	22	17	12	05			..
WOODSTOCK				01	12	21	31	29	24	19	32	17	02			..
TORONTO				06	19	25	33	25	26	29	20	28	04			..
LINDSAY				01	20	18	25	28	32	34	34	28	16			..
BARRE				12	12	18	19	28	30	31	30	24	00			..
KINGSTON				10	19	17	21	21	21	16	23	11	03			..
.....																..
.....																..
.....																..
MONTREAL				00	20	31	36	36	35	29	21	11	00			..
FREDERICTON				12	25	19	15	50	46	17	15	35	06			..
SYDNEY				05	19	26	35	30	33	37	38	20	08			..
.....																..
.....																..
.....																..
MEAN PROPORTION FOR MONTH	0.15			0.15	0.21	0.24	0.25	0.21	0.18					0.20	0.37	0.40
MAXIMUM DAILY AROUND	0.81			0.72	0.87	0.89	1.00	0.86	0.91					0.95	0.90	0.94
DATE	9			27	8	6	16	8	7					12	1	21
NO. OF DAYS COMPLETELY CLOUDY	0			16	17	18	15	18	18					12	11	9

PROBABILITIES.

The probabilities issued by this office at 11 p.m. each evening are posted up at every telegraph station in Canada, and are for the 24 hours, beginning 8 a.m. the following day.

The number of predictions issued during the month was 500. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage Fully.
LOWER LAKE REGION.....	108	71	22	15	75.9
UPPER ST. LAWRENCE	96	61	18	17	72.9
LOWER ST. LAWRENCE.....	95	68	14	13	79.0
GULF.....	95	76	8	11	84.2
MARITIME PROVINCES	106	65	20	21	70.8
TOTAL	500	341	82	77	76.4

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by 2 and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at the "Probability Stations," as well as the telegraphic reports, are used.

The daily probabilities and storm warnings were issued by Probability Officer H. V. Payne.

STORM WARNINGS.

During the month warnings on the approach of six storms were issued to our agents and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 68, of which 68 or 100 per cent. were verified. At 5 stations, however, the force exceeded and at 9 did not reach that indicated by the signals displayed; three stations reported warnings received late, owing to delay in transmission.

In connection with the warnings, predictions as to the probable direction of the winds were given, and of the 68 warnings verified as to force 56 or 82.3 per cent. were fully verified, and 61 or 89.7 per cent. were fully and partially verified, as to direction.

No. 1. At 10.40 a.m. on the 5th Scotia and Fundy were warned for a heavy easterly gale, and during the same night as the disturbance for which these warnings were issued passed across the Maritime Provinces a heavy easterly gale was experienced generally, but no wrecks apparently occurred. Signals were lowered at 11 a.m. on the 7th.

No. 2. Cautionary Signal No. 1 for a moderate easterly gale was ordered for all Ocean stations at 4.20 p.m. on the 11th, in advance of an area of depression south of the Lake Region. These signals were changed for a heavy westerly gale at 10.20 a.m. on the 12th, the disturbance having become more important as it advanced. During the evening and night of the 12th a heavy gale prevailed from the south and west in all districts, attended by an unusually high tide. Point Lepreaux says highest tide on record. St. Andrews reports very high tide on the 12th; damage done to wharves, cellars overflowed. Liverpool says heaviest tide for years. Point Escuminac recorded 51 miles an hour. Yarmouth, 48 miles. St. John, 50 miles, together with a very high tide, which did great damage. Signals were lowered on the morning of the 13th.

No. 3. The Bay of Fundy was warned for a moderate S. E., S. and S. W. gale at 10.20 p.m. on the 13th, and the following evening a moderate storm is reported to have occurred at Point Lepreaux and St. John. Signals were lowered on the early morning of the 15th.

No. 4. At 10.50 a.m. on the 17th Ocean stations were warned for a heavy E. through N. to N. W. gale in advance of a disturbance off the Carolina Coast. The disturbance afterwards passed to the southward of Nova Scotia, and caused in the Maritime Provinces a snow and sleet storm, together with strong winds and gales generally. At Point Escuminac, where the greatest force of the gale was apparently felt, 56 miles was recorded for one hour, and an average velocity of 53 miles for ten hours. Signals were ordered down on the night of the 19th.

No. 5. At 10.10 p.m. on the 21st cautionary signals for a moderate easterly gale were ordered for Ocean stations, and the next morning, the disturbance for which the warnings were issued,

having become more important, storm signal No. 3 for a heavy easterly gale was substituted for No. 1. During the night of the 22nd a fresh to heavy gale prevailed throughout the districts warned. Yarmouth recorded S. E. 50 miles an hour; St. John, S. E. 46 miles; Charlottetown, S. W. 31 miles. Signals were lowered on the morning of the 23rd.

No. 6 Ocean stations were warned for a moderate easterly gale at 10.10 p.m. on the 24th, in advance of an area of low pressure then over Virginia. Afterwards as it passed over the Maritime Provinces it gave a gale during the evening of the 25th, which, at Sydney, Liverpool and Canso, increased to a strong gale. Signals were lowered on the night of the 25th.

TORONTO OBSERVATORY.—MAGNETIC REVIEW FOR JANUARY, 1891.

The magnets were slightly disturbed on the nights of the 1st and 2nd. On the morning of the 3rd the diurnal declination curve was well marked. From the 3rd to the 9th the magnets were comparatively steady, with the exception of a little irregularity on the 5th and 6th after 10 a.m., lasting but a brief period. The 9th was an exceptionally steady day until after 11 p.m., when slight disturbing action appeared and continued more or less up to the morning of the 12th, followed by a quiet magnet until after 10 p.m. of the 13th. The declination magnet then took up a sharp tremor, at the same time moving east. It continued slightly disturbed all morning of the 14th, and came to rest about 11 a.m. A very steady magnet was shown up to 10 p.m. of the 15th, when slight disturbance again commenced; its activity increased considerably after 10 a.m., the declination magnet then began moving in sharp swings with a well marked westerly tendency, the maximum reading occurring at 11.45 a.m. Some very rapid vibrations were recorded during the afternoon, especially of the h. f. After 8 p.m. the magnets became quieter, but at 10.25 p.m. an increased activity commenced, the declination magnet moving slowly east; at 10.40 p.m. it paused for a short time and then again moved east, the extreme position being reached at 11.05 p.m. At midnight the magnets were much quieter. Between 10 a.m. and 11.05 a.m. of the 16th a well marked decrease of the horizontal force was shown.

Disturbing action continued without intermission until the morning of the 22nd. It was more marked on the night of the 18th and morning of the 19th. At 6.10 a.m. of the 23rd the declination magnet took a short easterly hitch, followed by a westerly swing; the magnet, however, quieted down shortly afterwards. A slight change of the vertical component and a larger one of the horizontal took place also at 6.10 a.m. After 10 p.m. of the 23rd another slight disturbance commenced, and was visible to 10 a.m. of the 24th.

A quiet period then ensued, lasting until 10.37 p.m. of the 28th, when a sudden easterly movement of 18' was recorded. The magnet afterwards gradually rose to its normal reading, and by 2 a.m. of the 29th was steady. The remainder of the month was free from any irregularities, the last two days in fact being the quietest during the month.

There were no auroras observed during the month. On the 2nd, 5th, 6th, 7th, 8th, 9th, 12th, 18th and 30th the sky was clear, but no aurora was observed. On all other nights clouds or haze would have hidden any aurora which might have existed.

CHARLES CARPMAEL,
Director.

METEOROLOGICAL OFFICE,
TORONTO, March 5th, 1891.

METEOROLOGICAL SERVICE, DOMINION OF CANADA.

Monthly Weather Review.

FEBRUARY, 1891.

INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraphic reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief Signal Officer, Washington, D. C.

ATMOSPHERIC PRESSURE.

The average pressure, as determined from the observations taken at telegraph reporting stations, was slightly above the normal of seventeen years in Nova Scotia, New Brunswick and Prince Edward Island; elsewhere it was below the normal.

During the 1st, an area of low pressure was moving across the Maritime Provinces towards Newfoundland, rain fell in Nova Scotia and southern portion of New Brunswick, and snow in the northern part of New Brunswick and along the St. Lawrence. At the same time an important anti-cyclonic movement accompanied by very low temperature over the North-West Territories was spreading eastward over the Lake Region, there giving strong northwest winds and falling temperature. At night the northwest winds were felt as far east as the Gulf, and by the morning of the 2nd, with maximum pressure north of the Lake Region, the temperature was from 20° to 35° below zero in northern Ontario, and from 10° to 20° above in the Maritime Provinces.

A pronounced cyclonic development occurred west of the Mississippi Valley early on the 2nd, the centre thence moved quickly to the Lake Region where at night it caused a rapid rise in temperature and a fall of snow turning to rain. During the 3rd, the northwest anti-cyclone moved southeastward whilst the storm centre moved with increasing energy to New Brunswick and the Gulf. A high westerly wind with falling temperature prevailed all day in the Lake Region, and in the Maritime Provinces there was a southerly gale and heavy rain.

On the 4th, as the anti-cyclone was passing from the Mississippi Valley to the Atlantic States, lower pressure and milder weather prevailed in the Northwest Territories, fair, cold weather prevailed in Ontario and Quebec, and there was a strong westerly wind with falling temperature in the Maritime Provinces. The charts of the 5th showed a continuance of low pressure and comparatively mild weather in the Northwest, decreasing pressure with fair, milder weather in Ontario and decidedly high pressure with cold weather over the Maritime Provinces.

On the 6th heavy snow and rain fell, with decreasing pressure in the Maritime Provinces, and there was a little snow and a considerable rise in temperature in Quebec. During the night of the 6th there was a decided cyclonic development over the Southwest States, and a marked anti-cyclonic movement from the northward, with very low temperature, appeared over the Northwest Territories. Next day the storm centre moved to Ohio and thence eastward with diminishing energy; it caused several inches of snow over the Lower Lake Region during the afternoon and evening, a lesser fall at night along the Upper St. Lawrence, and a moderate fall during the early part of the 8th in the Maritime Provinces.

Another cyclonic development occurred over the Southwest States on the 8th, and the centre took a course to the Lake Region, there causing a rainy day on the 9th; at night it caused rain and snow along the St. Lawrence and rain and snow with a moderate southeasterly gale in the Maritime Provinces. While this movement was in progress the anti cyclone moved southeastward from the Northwest Territories and Manitoba and the weather there became more moderate.

After this for several days the only important cyclonic movement was on our Pacific Coast, where the weather was stormy and rainy; in other parts of the Dominion anti cyclonic conditions were generally prevalent and the weather was mostly fair. During the night of the 13th an anti-cyclonic development over northern Canada caused a decided fall of temperature from the Lakes to the Atlantic.

On the 14th the centre of the principal anti-cyclone was moving southeast across the Ottawa Valley, and there was a developing depression over the Northwest States. Next day this depression was moving across the Upper Lakes and at night caused a few showers in Northern Ontario and in Quebec. A small subsidiary depression which developed to the southeastward of the Lakes caused rain and snow over the greater part of Ontario during the night of the 16th, and another, which seems to have formed over New England, caused rain and snow in Nova Scotia early on the 17th. On the 17th a disturbance developed west of the Lake Region, and with increasing energy moved quickly eastward down the St. Lawrence and across the Gulf, followed by an anti-cyclone from the Northwest States. The movement caused a small fall of rain and snow and strong winds, and during the night of the 18th as the pressure increased rapidly over the Lakes, there was a decided fall in temperature, and next day fair, comparatively cold weather prevailed from the Lake Region eastward.

While during the 19th anti-cyclonic conditions predominated over Canada and the eastern portion of the United States, an extensive and important depression covered the western portion of the United States. A rapid transference of the low pressure to the northeastward occurred at night, and as the barometer fell in Ontario there was a heavy fall of snow, turning to rain, which continued next day. On the 21st the storm moved across Northern Canada to the Gulf, and snow and rain fell in Quebec and the Maritime Provinces, while with anti-cyclonic conditions spreading eastward and southward continued fine, cold weather prevailed throughout the Northwest Territories. The main body of high pressure was on the 22nd, moving across the Lake Region, giving colder northwest winds from the Lake Region to the Gulf, and on the Californian Coast there was an important cyclonic movement, giving stormy weather and snow in British Columbia. This Pacific cyclone moved across the continent, it passed across Wyoming and thence northeastward to Lake Superior; it caused some snow in the Northwest Territories on the 23rd and a rainy day in the Lake Region on the 24th. In its subsequent movement east over northern Canada the storm gradually dispersed; it gave a heavy fall of rain along the St. Lawrence on the morning of the 25th, and a lighter fall later in the day in the Maritime Provinces. A subsidiary had by the morning of the 26th formed over the South Atlantic States, whence, with increasing energy, it moved quickly northeastward to the Maritime Provinces, there causing a very heavy rainfall between the afternoon of the 26th and forenoon of the 27th.

Anti-cyclonic movements which set in over the Northwest Territories on the 24th gradually spread and became more pronounced with increasing cold, and on the morning of the 27th the temperature at Winnipeg fell to -32 , Prince Albert -46 , Qu'Appelle -40 .

The anti-cyclonic conditions spreading eastward gave a northwesterly gradient and moderately cold weather in Ontario and Quebec by the 26th, and in the Maritime Provinces on the 27th and 28th.

TEMPERATURE.

The average temperature, as determined from the observations taken at telegraph reporting stations, was above the normal of seventeen years at nearly all stations in Ontario and at southerly stations in the more easterly provinces; elsewhere it was below the normal.

The highest and lowest temperatures in each Province during February were:—

BRITISH COLUMBIA. $51^{\circ}0$ on 3rd and 5th at Quamichan; $-11^{\circ}5$ on 22nd at Kamloops.

NORTH WEST TERRITORIES. $39^{\circ}8$ on 3rd at Calgary; $-55^{\circ}4$ on 1st at Prince Albert.

MANITOBA. $36^{\circ}0$ on 6th at Fort Ellice; $-49^{\circ}5$ on 2nd at Russell.

ONTARIO. $53^{\circ}0$ on 15th at Point Pelee, and $53^{\circ}0$ on 25th at Stoney Creek; $-50^{\circ}3$ on 4th at White River.

QUEBEC. $51^{\circ}4$ on 26th at Chicoutimi; $-32^{\circ}6$ on 6th at Richmond.

NEW BRUNSWICK. $49^{\circ}5$ on 25th at Fredericton; $-28^{\circ}0$ on 14th at Parker's Ridge.

NOVA SCOTIA. $52^{\circ}2$ on 25th at Yarmouth; $-14^{\circ}0$ on 3rd at Truro.

P. E. ISLAND. $45^{\circ}0$ on 26th at Georgetown; $-19^{\circ}4$ on 3rd at Kilmahumraig.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, FEBRUARY, 1891.

	PRESSURE IN INCHES.				TEMPERATURE OF AIR.				No. of days completely clouded.	DIRECTION OF WIND FROM								VELOCITY OF WIND.				PRECIPITATION.				No. of Thunder storms.	No. of Auroras.	No. of fair days.	Diff. from average.	Amount.	in.	No. of fogs.															
	Mean actual.		Mean reduced.		Years observed.	Highest.	Lowest.	Range.		Mean.	Diff. from average.	Highest days velocity.	Date and direction.	Amount.	in.	No. of fair days.	Diff. from average.	Amount.	in.																												
	in.	in.	in.	in.																																											
in.	in.	in.	in.																																												
ALBERTA.																																															
Medicine Hat	30.16	30.68	29.57	1.11	0.0	-10.9	7.35	6	4	-32.0	24	24.0	42.5	0.5	3	10	2	0	0	3	14	3	22	56	9.3	2 W	1.51	1.22	8.20	0	0	0	0	0	0	0	0	0	0						
Edmonton	30.49	30.81	29.50	1.22	1.5	-4.3	38.0	4	-39.5	1	29.6	35.5	0.5	3	4	2	3	1	1	1	1	4	37	56	6.8	7 W	0.15	-0.50	3.25	0	0	0	0	0	0	0	0	0	0						
Prince Albert	30.13	30.80	29.55	1.25	-12.7	19.6	17	15.4	1	-35.4	1	29.6	48.0	0.4	4	2	3	3	6	5	1	1	4	37	56	5	20 N	0.50	0.50	16.12	3	0	0	0	0	0	0	0	0	0					
Maple Creek	30.13	30.80	29.55	1.25	0.6	-12.4	33.0	6-19	33.0	1	29.6	48.0	0.5	4	2	3	3	6	5	1	1	4	37	56	5	20 N	0.50	0.50	16.12	3	0	0	0	0	0	0	0	0	0	0					
Swift Current	30.13	30.80	29.55	1.24	-3.1	-9.8	53.4	6	-30.0	1	29.6	48.0	0.5	4	2	3	3	6	5	1	1	4	37	56	5	20 N	0.50	0.50	16.12	3	0	0	0	0	0	0	0	0	0	0					
Qu'Appelle	30.13	30.80	29.55	1.24	-3.1	-9.8	53.4	6	-30.0	1	29.6	48.0	0.5	4	2	3	3	6	5	1	1	4	37	56	5	20 N	0.50	0.50	16.12	3	0	0	0	0	0	0	0	0	0	0					
Gleichen	30.13	30.80	29.55	1.24	-3.1	-9.8	53.4	6	-30.0	1	29.6	48.0	0.5	4	2	3	3	6	5	1	1	4	37	56	5	20 N	0.50	0.50	16.12	3	0	0	0	0	0	0	0	0	0	0					
Regina	30.13	30.80	29.55	1.24	-3.1	-9.8	53.4	6	-30.0	1	29.6	48.0	0.5	4	2	3	3	6	5	1	1	4	37	56	5	20 N	0.50	0.50	16.12	3	0	0	0	0	0	0	0	0	0	0					
Gravel	30.13	30.80	29.55	1.24	-3.1	-9.8	53.4	6	-30.0	1	29.6	48.0	0.5	4	2	3	3	6	5	1	1	4	37	56	5	20 N	0.50	0.50	16.12	3	0	0	0	0	0	0	0	0	0	0					
Chaplin	30.13	30.80	29.55	1.24	-3.1	-9.8	53.4	6	-30.0	1	29.6	48.0	0.5	4	2	3	3	6	5	1	1	4	37	56	5	20 N	0.50	0.50	16.12	3	0	0	0	0	0	0	0	0	0	0					
Plains Fork	30.13	30.80	29.55	1.24	-3.1	-9.8	53.4	6	-30.0	1	29.6	48.0	0.5	4	2	3	3	6	5	1	1	4	37	56	5	20 N	0.50	0.50	16.12	3	0	0	0	0	0	0	0	0	0	0					
Band	30.13	30.80	29.55	1.24	-3.1	-9.8	53.4	6	-30.0	1	29.6	48.0	0.5	4	2	3	3	6	5	1	1	4	37	56	5	20 N	0.50	0.50	16.12	3	0	0	0	0	0	0	0	0	0	0					
Colham	30.13	30.80	29.55	1.24	-3.1	-9.8	53.4	6	-30.0	1	29.6	48.0	0.5	4	2	3	3	6	5	1	1	4	37	56	5	20 N	0.50	0.50	16.12	3	0	0	0	0	0	0	0	0	0	0					
Green Adelaide	30.13	30.80	29.55	1.24	-3.1	-9.8	53.4	6	-30.0	1	29.6	48.0	0.5	4	2	3	3	6	5	1	1	4	37	56	5	20 N	0.50	0.50	16.12	3	0	0	0	0	0	0	0	0	0	0					
MANITOBA.																																															
Winnipeg	30.12	30.71	29.57	1.14	-8.8	-3.4	33.1	6	-42.0	2	25.8	48.1	0.5	4	4	7	1	4	0	1	1	16	10	56	21.2	25 NW	1.50	1.07	7.21	1	0	0	0	0	0	0	0	0	0						
Winnipeg	30.11	30.73	29.47	1.26	-7.4	-6.6	19.5	19	-34.5	1	24.4	40.5	0.5	4	33	37	24	10	33	14	12	23	28	254	36.8	7 NE	0.88	-0.12	12.16	0	0	0	0	0	0	0	0	0	0	0					
Chaplin	30.11	30.73	29.47	1.26	-7.4	-6.6	19.5	19	-34.5	1	24.4	40.5	0.5	4	33	37	24	10	33	14	12	23	28	254	36.8	7 NE	0.88	-0.12	12.16	0	0	0	0	0	0	0	0	0	0	0					
Chaplin	30.11	30.73	29.47	1.26	-7.4	-6.6	19.5	19	-34.5	1	24.4	40.5	0.5	4	33	37	24	10	33	14	12	23	28	254	36.8	7 NE	0.88	-0.12	12.16	0	0	0	0	0	0	0	0	0	0	0					
Chaplin	30.11	30.73	29.47	1.26	-7.4	-6.6	19.5	19	-34.5	1	24.4	40.5	0.5	4	33	37	24	10	33	14	12	23	28	254	36.8	7 NE	0.88	-0.12	12.16	0	0	0	0	0	0	0	0	0	0	0					
Chaplin	30.11	30.73	29.47	1.26	-7.4	-6.6	19.5	19	-34.5	1	24.4	40.5	0.5	4	33	37	24	10	33	14	12	23	28	254	36.8	7 NE	0.88	-0.12	12.16	0	0	0	0	0	0	0	0	0	0	0	0				
Chaplin	30.11	30.73	29.47	1.26	-7.4	-6.6	19.5	19	-34.5	1	24.4	40.5	0.5	4	33	37	24	10	33	14	12	23	28	254	36.8	7 NE	0.88	-0.12	12.16	0	0	0	0	0	0	0	0	0	0	0	0				
Chaplin	30.11	30.73	29.47	1.26	-7.4	-6.6	19.5	19	-34.5	1	24.4	40.5	0.5	4	33	37	24	10	33	14	12	23	28	254	36.8	7 NE	0.88	-0.12	12.16	0	0	0	0	0	0	0	0	0	0	0	0	0			
Chaplin	30.11	30.73	29.47	1.26	-7.4	-6.6	19.5	19	-34.5	1	24.4	40.5	0.5	4	33	37	24	10	33	14	12	23	28	254	36.8	7 NE	0.88	-0.12	12.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Chaplin	30.11	30.73	29.47	1.26	-7.4	-6.6	19.5	19	-34.5	1	24.4	40.5	0.5	4	33	37	24	10	33	14	12	23	28	254	36.8	7 NE	0.88	-0.12	12.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chaplin	30.11	30.73	29.47	1.26	-7.4	-6.6	19.5	19	-34.5	1	24.4	40.5	0.5	4	33	37	24	10	33	14	12	23	28	254	36.8	7 NE	0.88	-0.12	12.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chaplin	30.11	30.73	29.47	1.26	-7.4	-6.6	19.5	19	-34.5	1	24.4	40.5	0.5	4	33	37	24	10	33	14	12	23	28	254	36.8	7 NE	0.88	-0.12	12.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chaplin	30.11	30.73	29.47	1.26	-7.4	-6.6	19.5	19	-34.5	1	24.4	40.5	0.5	4	33	37	24	10	33	14	12	23	28	254	36.8	7 NE	0.88	-0.12	12.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chaplin	30.11	30.73	29.47	1.26	-7.4	-6.6	19.5	19	-34.5	1	24.4	40.5	0.5	4	33	37	24	10	33	14	12	23	28	254	36.8	7 NE	0.88	-0.12	12.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chaplin	30.11	30.73	29.47	1.26	-7.4	-6.6	19.5	19	-34.5	1	24.4	40.5	0.5	4	33	37	24	10	33	14	12	23	28	254	36.8	7 NE	0.88	-0.12	12.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chaplin	30.11	30.73	29.47	1.26	-7.4	-6.6	19.5	19	-34.5	1	24.4	40.5	0.5	4	33	37	24	10	33	14	12	23	28	254	36.8	7 NE	0.88	-0.12	12.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chaplin	30.11	30.73	29.47	1.26	-7.4	-6.6	19.5	19	-34.5	1	24.4	40.5	0.5	4	33	37	24	10	33	14	12	23	28	254	36.8	7 NE	0.88	-0.12	12.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chaplin	30.11	30.73	29.47	1.26	-7.4	-6.6	19.5	19	-34.5	1	24.4	40.5	0.5	4	33	37	24	10	33	14	12	23	28	254	36.8	7 NE	0.88	-0.12	12.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chaplin	30.11	30.73	29.47	1.26	-7.4	-6.6	19.5	19	-34.5	1	24.4	40.5	0.5	4	33	37	24	10	33	14	12	23	28</																								

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION, &c.—Continued.

	PRESSURE IN INCHES.				TEMPERATURE OF AIR.				MEAN AMOUNT OF CLOUD.				DIRECTION OF WIND FROM.				VELOCITY OF WIND.				PRECIPITATION.			
	Mean actual.		Mean reduced.		Highest.		Lowest.		Date.		Range.		Mean.		Diff. from average.		Years observed.		Highest.		Lowest.		Range.	
	in.	in.	in.	in.	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	
ONTARIO—Continued.																								
Axe Lake.....	17.1	17.1	17.1	17.1	7.2	5.42	6	25	18.6	4	17.9	32.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coldwater.....	20.7	20.7	20.7	20.7	7.2	5.46	2	25	15.4	5	20.9	47.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Beatrice.....	17.4	17.4	17.4	17.4	4.4	15.43	0	25	15.0	4	18.2	29.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gravenhurst.....	19.9	19.9	19.9	19.9	4.8	20.52	0	25	17.6	4	22.3	38.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
North Bruce.....	25.6	25.6	25.6	25.6	7.6	2.46	0	24	5.0	14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rockville.....	27.9	27.9	27.9	27.9	7.7	14.45	0	25	35.0	5	28.0	58.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Zurich.....	27.9	27.9	27.9	27.9	7.7	10.50	0	25	5.0	4	14.6	31.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Point Clark.....	26.8	26.8	26.8	26.8	6.1	18.41	0	24	10.0	14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Mary's.....	27.1	27.1	27.1	27.1	2.9	2.47	0	25	3.0	5	14.9	30.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Paris.....	27.1	27.1	27.1	27.1	0.4	1.49	5	17	1.0	4	18.2	36.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lockport.....	25.0	25.0	25.0	25.0	7.1	4.50	0	25	5.0	4	16.4	34.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	23.2	23.2	23.2	23.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	28.4	28.4	28.4	28.4	10.1	8.50	1	24	3.8	4	10.7	29.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	31.3	31.3	31.3	31.3	3.9	2.52	0	15	4.0	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	34.8	34.8	34.8	34.8	10.7	13.53	0	15	8.0	3	6.1	24.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Point Pelee.....	30.2	30.2	30.2	30.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kingsville.....	30.1	30.1	30.1	30.1	5.8	5.50	5	25	8.0	3	15.7	36.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chatham.....	29.5	29.5	29.5	29.5	6.0	5.49	0	25	2.0	4	16.3	38.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ridgeway.....	28.8	28.8	28.8	28.8	7.9	7.49	0	25	3.0	4	13.8	31.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Woodstock.....	25.1	25.1	25.1	25.1	5.4	17.42	7	25	2.2	4	17.4	35.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
London.....	28.0	28.0	28.0	28.0	6.5	17.51	0	25	1.0	4	13.9	33.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Port Stanley.....	27.8	27.8	27.8	27.8	7.6	5.48	0	25	6.0	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Brantford.....	27.7	27.7	27.7	27.7	5.1	17.43	9	16	2.6	5	11.5	32.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. George.....	24.4	24.4	24.4	24.4	7.0	9.49	4	16	0.3	4	17.2	34.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Guelph.....	24.1	24.1	24.1	24.1	6.7	8.46	0	25	0.0	4	16.4	37.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Elora.....	25.2	25.2	25.2	25.2	5.8	12.46	4	25	0.5	4	14.2	33.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Galt.....	30.0	30.0	30.0	30.0	6.1	5.45	0	16	7.0	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Niagara Falls, S.....	16.2	16.2	16.2	16.2	0.3	1.42	3	16	21.4	28	21.3	35.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sault Ste. Marie.....	28.6	28.6	28.6	28.6	1.5	2.47	0	25	1.5	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
DeCewsville.....	12.3	12.3	12.3	12.3	1.7	3.48	0	24	20.3	24	27.9	58.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sombra.....	25.2	25.2	25.2	25.2	7.7	10.16	8	25	3.1	4	15.4	35.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Conestogo.....	31.3	31.3	31.3	31.3	10.2	7.53	0	25	4.0	4	13.9	34.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stoney Creek.....	25.0	25.0	25.0	25.0	9.0	3.50	8	25	7.6	3	13.9	31.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Georgetown.....	28.0	28.0	28.0	28.0	5.3	5.14	9	25	2.1	4	14.0	28.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sharon.....	22.5	22.5	22.5	22.5	4.3	3.44	0	25	5.6	5	18.5	32.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Toronto.....	30.0	30.0	30.0	30.0	7.0	29.30	1	40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Alton.....	19.8	19.8	19.8	19.8	3.3	12.43	5	26	15.0	5	20.9	41.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lindsay.....	26.0	26.0	26.0	26.0	8.6	8.44	5	25	6.5	4	16.9	31.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Norwood.....	22.6	22.6	22.6	22.6	4.4	17.43	6	25	4.6	5	16.9	30.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Deseronto.....	15.1	15.1	15.1	15.1	3.3	15.43	5	25	27.0	4	35.8	28.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kingston.....	20.9	20.9	20.9	20.9	10.3	6.44	0	26	13.6	5	22.5	41.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ottawa.....	15.7	15.7	15.7	15.7	2.8	2.48	1	25	28.9	5	20.5	31.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lakefield.....	14.6	14.6	14.6	14.6	3.4	4.48	0	25	30.1	5	28.1	33.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Alexandria.....	20.7	20.7	20.7	20.7	6.8	5.51	3	15	0.0	4	12.2	34.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Renfrew.....	16.1	16.1	16.1	16.1	3.8	5.46	9	25	22.5	4	25.8	47.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Peterborough.....	17.6	17.6	17.6	17.6	5.0	2.44	0	25	25.0	5	20.5	50.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Barroff.....	17.9	17.9	17.9	17.9	7.6	3.43	3	16	15.2	5	23.0	47.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Clontarf.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

STATIONS RECEIVED TOO LATE FOR THE JANUARY REVIEW.

PROVINCE.	STATION.	MEAN	HIGHEST		LOWEST		PRECIPITATION.		AURORAS	THUNDER
		TEMP.	TEMP.	DATE.	TEMP.	DATE.	Amount.	Days.		
		°	°		°		in.		ON	STORMS ON
British Columbia	Fort Simpson.....	12.00	55.0	19	25.6	6	11.69	25		
	Kerens.....	....	45.5	27	....		0.20	3		
N. W. Territories	Regina	11.13	41.0	19	-34.0	31	0.5	3		
	Oonikap	- 1.55	39.0	19	-44.0	11	1.37	20		
Manitoba	Channel Island.....	- 0.54	28.0	20	-40.5	15	0.50	3	10, 13, 15.	
Ontario	Sombra	27.91	48.0	1	8.7	15	1.03	23		
	Galt.....	22.41	40.4	2	- 4.4	16	1.48	14		
	Chapleau.....	2.43	31.0	23	-32.0	4	1.27	7		
	Waukegan.....	....	42.0	23	8.0	13	....		
Quebec.....	Pointe des Monts....	10.40	30.0	23	-10.0	16	1.90	6		
Nova Scotia.....	White Head.....	27.58	43.0	12	10.0	28	5.82	8		
New Brunswick.....	Parker's Ridge.....	14.68	42.0	12	-24.0	27	8.96	12		

The observer at Channel Island remarks that on the 8th January, pine grosbeaks and wax-wings were flying about.

At Fort Simpson from the 12th to 16th inclusive, dense fogs.

PRECIPITATION.

The rainfall throughout the Dominion has in almost every part considerably exceeded the average fall, the excess being greatest in Nova Scotia, a slight defect occurring in B. Columbia.

The distribution is as follows :-

In B. COLUMBIA the rainfall was 0.59 in., about 1.50 in. below the average.

In the N. W. TERRITORIES and Manitoba no rain is recorded.

In ONTARIO, West and South-West District, it was 2.73 in., or 1.67 in. above the average. In the North and North-West District it was 1.28 in., or 0.74 in. above the average. In the Central District it was 1.72 in., or 1.07 in. above the average, and in the East and North-East District it was 1.35 in., or 0.66 in. above the average.

In QUEBEC it was 0.93 in., or 0.61 in. above the average.

In NEW BRUNSWICK it was 1.84 in., or 0.42 in. above the average.

In NOVA SCOTIA it was 4.74 in., or 3.01 in. above the average.

In P. E. ISLAND it was 2.15 in., or 1.33 in. above the average.

Rainfall 5 in. and upwards during month :

N. BRUNSWICK. Grand Manan, 5.08 in.

NOVA SCOTIA. Halifax, 6.94 in. ; Yarmouth, 5.73 in. ; White Head, 5.89 in. ; Truro, 5.13 in.

Rainfall 1 in. and upwards in 24 hours :

1st, Grand Manan, 2.00 in. ; Pelee Island, 1.04 in.

5th, Fort Simpson, 1.08 in.

6th, Georgetown, P. E. I., 1.77 in.

11th, White Head, 1.01 in.

16th, Stoney Creek, 1.02 in. ; Oil Springs, 1.00 in. ; Blenheim, 1.23 in. ; Dealtown, 1.28 in.

17th, Sprucedale, 1.00 in. ; Pelee Island, 2.51 in. ; Cottam, 1.35 in.

20th, Petrolia, 1.02 in. ; Stoney Creek, 1.17 in. ; Thedford, 1.00 in. ; Sombra, 1.30 in. ; Presque Isle, 1.50 in. ; Dealtown, 1.19 in.

21st, De Cewsville, 1.16 in.

23rd, Pictou, 2.12 in.

24th, Sprucedale, 1.50 in. ; Point Clark, 1.12 in. ; Beatrice, 1.45 in. ; Bancroft, 1.05 in. ; Sombra, 2.00 in. ; Lyons, 1.05 in. ; Glastonbury, 1.61 in. ; Presque Isle, 2.00 in. ; Warton, 1.30 in. ; Lions Head, 1.35 in.

25th, Bermuda, 1.37 in. ; Parry Sound, 1.72 in. ; Chapleau, 1.17 in. ; Joly, 1.23 in. ; Whiteside, 1.47 in. ; Brome, 1.20 in.

26th, Yarmouth, 1.41 in. ; Digby, 1.00 in. ; Dorchester, 1.12 in.

27th, Halifax, 1.83 in. ; Sydney, 2.00 in. ; White Head, 1.07 in. ; Fort Hastings, 1.57 in. ; Georgetown, 2.33 in. ; Truro, 1.10 in.

Snowfall in the same districts as in the rainfall :—

B. COLUMBIA. 12·8 in.

N. W. TERRITORIES. 6·9 in., or about 2 in. above average.

MANITOBA. 9·4 in., or 1·2 in. below the average.

ONTARIO. 6·2 in., or 4·3 in. below the average ; 18·4 in., or 3·9 in. above the average ; 12·9 in., or 1·0 in. above the average ; 15·5 in., or 0·3 below the average.

QUEBEC.—24·4 in., or 4·8 in. above the average.

N. BRUNSWICK. 20·0 in., or 2·4 in. below the average.

N. SCOTIA. 10·4 in., or 8·2 in. below the average.

P. E. ISLAND. 14·3 in., or 8·4 in. below the average.

Snowfall 15 in. and upwards during month :

B. COLUMBIA. Agassiz, 17 in. ; Maple Grove, 16 in. ; Port Moody, 22 in.

N. W. TERRITORIES.—Medicine Hat, 15 in.

MANITOBA. Burnside, 18 in. ; Posen, 20 in. ; Minnedosa, 15 in.

ONTARIO.—Saugeen, 24 in. ; Port Dover, 20 in. ; Parry Sound, 20 in. ; Rockliffe, 16 in. ; Cook's Mills, 22 in. ; Heron Bay, 20 in. ; Novar, 17 in. ; Ignace, 20 in. ; Biscotasing, 23 in. ; Savanne, 22 in. ; London, 15 in. ; Whiteside, 16 in. ; Owen Sound, 19 in. ; Sprucedale, 16 in. ; Lakefield, 18 in. ; Beatrice, 21 in. ; Gravenhurst, 16 in. ; De Cewsville, 17 in. ; Georgina, 18 in. ; Lucknow, 18 in. ; Sault Ste. Marie, 49 in. ; Bancroft, 29 in. ; Bognor, 30 in. ; Barclay, 17 in. ; Midland, 25 in. ; Thompson, 27 in. ; Presque Isle, 21 in. ; Orillia, 34 in. ; Port Hope, 26 in. ; Wiarton, 18 in. ; Goderich, 18 in. ; Peterborough, 21 in. ; Lindsay, 19 in. ; Deseronto, 15 in. ; Ottawa, 30 in. ; Little Forks, 18 in. ; Coldwater, 31 in. ; Durham, 33 in.

QUEBEC. Father Point, 21 in. ; Quebec, 19 in. ; Cape Magdalen, 15 in. ; Point des Monts, 82 in. ; Chicoutimi, 20 in. ; Huntingdon, 17 in. ; Richmond, 27 in.

N. BRUNSWICK.—St. Andrews, 16 in. ; Chatham, 26 in. ; Dalhousie, 17 in. ; Bathurst, 34 in. ; Fredericton, 25 in. ; Point Lepreaux, 15 in. ; Parker's Ridge, 31 in. ; St. John, 18 in. ; Point Escuminac, 32 in.

NOVA SCOTIA. Halifax, 18 in.

P. E. ISLAND.—Charlottetown, 15 in. ; Kilmahumlog, 18·3 in.

Snowfall 5 in. and upwards in 24 hours : —

1st, Port Hastings, 5 in. ; Richmond, 6 in. ; Ottawa, 6 in.

3rd, Father Point, 7 in. ; Cartier, 6 in. ; Whiteside, 5 in. ; Axe Lake, 6 in. ; Sault Ste. Marie, 8 in. ; Orillia, 8·5 in. ; Ottawa, 8 in. ; Coldwater, 5·8 in. ; Bathurst, 10 in. ; Bancroft, 8 in. ; Point des Monts, 9 in. ; Midland, 9 in. ; Point Escuminac, 5 in. ; Presque Isle, 6 in.

4th, Cape Magdalen, 8 in.

5th, Port Hope, 6 in.

7th, Chicoutimi, 5 in. ; Little Forks, 7 in.

8th, Yarmouth, 6·6 in. ; Huntingdon, 6 in.

9th, North Bay, 11 in. ; Sault Ste. Marie, 6 in. ; Port Moody, 5 in. ; Fredericton, 5 in.

10th, Port Hastings, 5 in. ; Point des Monts, 20 in. ; Point Lepreaux, 6 in. ; Dalhousie, 5 in. ; Richmond, 6 in. ; Parker's Ridge, 7 in. ; Kilmahumlog, 7 in. ; Point Escuminac, 6 in. ; Bathurst, 6 in.

11th, St. John, Nfld., 8 in. ; Thompson, 5 in.

16th, Chatham, N.B., 5·6 in. ; Point des Monts, 5 in.

17th, Fort Simpson, 6 in.

18th, Sault Ste. Marie, 6 in. ; Point des Monts, 6 in. ; Point Escuminac, 5 in. ; Durham, 6 in.

19th, St. John, Nfld., 6 in. ; Agassiz, 6 in.

20th, Port Stanley, 7·4 in. ; Port Dover, 6·2 in. ; Ignace, 14·5 in. ; Buda, 6 in. ; Nepigon, 6 in. ; St. Mary's, 5 in. ; Georgetown, 5·2 in. ; Ottawa, 5 in. ; Little Forks, 5 in. ; Port Moody, 6·5 in.

21st, Father Point, 7 in. ; Kilmahumlog, 6 in. ; Point Escuminac, 8 in. ; Sydney, 6 in.

22nd, Medicine Hat, 5 in. ; St. John, Nfld., 5 in. ; Chaplin, 6 in.

23rd, Minnedosa, 5·5 in. ; Russell, 5 in. ; Fleming, 6 in. ; Thompson, 7 in.

24th, Minnedosa, 6·1 in. ; Posen, 5·4 in. ; Brandon, 6 in. ; Point des Monts, 8 in. ; Point Escuminac, 5 in. ; Burnside, 12 in.

25th, Chicoutimi, 6 in. ; Thompson, 5 in.

26th, Point des Monts, 8 in.

27th, Bathurst, 5 in.

28th, Port Dover, 69 in.; Port Hope, 6 in.

Aurora recorded on

The class of aurora, if noted by Observer, is given (I) being the brightest, (IV) the feeblest in brilliancy.

2nd, Savanne.

3rd, Savanne.

5th, Swift Current, IV; Sydney, IV; Savanne, Gravenhurst, IV; Cotham, II; Posen, II; St. Alban's, III; Pembina, Alexandria, III.

6th, Port Arthur, III; Savanne, Posen, III; Brandon, IV; St. Alban's, IV; Pembina

7th, Minnedosa, IV; Chicoutimi, IV.

9th, Sydney, III; Savanne, Gravenhurst, III; Fort Ellice, I; Grenfell, Posen, I; Georgetown, III; Pembina, Little Forks, III.

10th, Grenfell, Cotham, IV; Chicoutimi, IV; Pembina, Little Forks, IV.

11th, Prince Albert, IV; Halifax, IV; Novar, IV; Savanne, Gravenhurst, III; Elora, Posen, I; Toronto, IV; Brandon, IV; Woodstock, N. B., III; Little Forks, IV; Durham, IV; Virden, IV; Fredericton, IV.

12th, Prince Albert, II; Novar, IV; Banff, IV; Cotham, II; Montreal, III.

13th, Swift Current, IV; Father Point, III; Novar, IV; Clontarf, IV; St. Alban's, II; Chicoutimi, III; Huntingdon, IV; Montreal, III.

14th, Father Point, III; St. Andrews, IV; Novar, IV; Egremont, IV; Savanne, Stoney Creek, II, Gravenhurst, II; Clontarf, III; Georgina, Chicoutimi, IV; Denbigh, I; Peterboro', II; Alexandria, III; Durham, IV; Truro, IV; Toronto, IV.

18th, Rapid City, Little Forks, IV.

26th, Savanne, Chicoutimi, Pembina.

27th, Prince Albert, IV.

28th, Pembina.

The following arrivals of birds have been noted during February:

Horned Sparrow—Sombra, 1st.

Crows—Alton, 21st; Stoney Creek, 15th (large number); Georgina, 10th; Paris, 25th; Brnam, 24th; Posen, Man., 10th; Cowal, 25th.

Robins—DeCewsville, 21st; Banff, 14th; Sombra, 22nd; Georgetown, 24th; Cottam, 8th.

Chipping Sparrow—DeCewsville, 22nd.

Shore Lark—Lucknow, 17th.

Blue Jay—Thedford, 12th; Sombra, 23rd.

Yellow Bird—Sombra, 23rd.

Grey Bird—Sombra, 25th.

Wild Geese—Cowal, 22nd; Cottam, 23rd.

Lightning and Thunder on—24th, Elora; 29th, Ridgetown, Cottam; 21st, Port Moody, during a heavy snow storm.

Mr. Wm. Mowbray, the observer at Sarnia, notes that the River St. Clair has not been frozen from Corunna to Sarnia this winter.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE
THE HORIZON IN THE MONTH OF FEBRUARY, 1890.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON.	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
WINNIPEG.....			0.10	0.40	0.60	0.69	0.63	0.62	0.61	0.57	0.46	0.43	0.08			
.....																
.....																
KINGSVILLE.....				.08	.22	.27	.31	.30	.31	.34	.32	.31	.18	.8.		
WOODSTOCK.....				.19	.30	.29	.30	.34	.34	.39	.35	.29	.06			
TORONTO.....				.21	.36	.44	.44	.48	.43	.41	.42	.41	.15			
LINDSAY.....				.11	.21	.27	.37	.48	.52	.48	.46	.35	.26	.18		
BARRIE.....																
KINGSTON.....			.01	.18	.32	.35	.37	.38	.45	.44	.50	.39	.21	.8.		
.....																
.....																
CORNWALL.....																
MONTREAL.....				.05	.25	.37	.48	.48	.49	.40	.49	.40	.35	.09		
FREDERICTON.....				.21	.38	.36	.41	.48	.46	.50	.55	.48	.31	.8.		
SYDNEY.....			.01	.24	.42	.40	.45	.45	.43	.40	.41	.39	.27	.01		
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)			0.59			0.25	0.25	0.36	0.34		0.34			0.39	0.40	0.37
MAXIMUM DAILY AMOUNT.....			0.90			0.85	0.86	0.89	1.00		0.94			1.00	0.92	0.96
DATE.....			27			11	14	14	4		4			19	23	5
NO. OF DAYS COMPLETELY CLOUDED.....			4			8	11	5	9		11			11	7	9

PROBABILITIES.

The probabilities issued by this office at 11 p. m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m.

The number of predictions issued during the month was 482. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			Percentage Fully.
		No. Fully.	No. Partly.	No. Not.	
LOWER LAKE REGION.....	105	79	16	10	82.0
UPPER ST. LAWRENCE.....	109	76	13	11	82.5
LOWER ST. LAWRENCE.....	93	72	9	12	82.3
GULF.....	89	61	18	10	78.7
MARITIME PROVINCES.....	95	75	10	10	84.2
TOTAL.....	482	363	66	53	82.2

The percentage of verification is obtained by taking the sum of those fully verified and half the sum of those partly verified and dividing by the whole number.

In ascertaining the percentage of verification of the predictions the reports from the agents at the "Probability Stations," as well as the telegraphic reports, are used.

The daily probabilities and the storm warnings were issued by Probability Officer R. F. Stupart.

STORM WARNINGS.

During the month warnings on the approach of five storms were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 53, of which 32, or 63.0 per cent., were verified. At 3 stations, however, the force did not reach that indicated by the signals displayed; 5 stations reported warnings received late, 4 owing to delay, and 1 to issue, and 6 stations reported a storm for which no warning was sent.

In connection with the warnings, predictions as to probable direction of the wind were given, and of the 32 warnings verified as to force, 27, or 84.4 per cent. were fully verified, and 32, or 100 per cent. were fully and partially verified.

No. 1. At 5 p.m. on the 31st January, Charlottetown, P. E. I., Pictou, N. S., and all stations along the Atlantic coast and in the Bay of Fundy were warned to expect a fresh gale from the east in consequence of a cyclone then over the Lakes, which, however, on reaching the Maritime Provinces dispersed and no storm occurred.

No. 2. At 11 p.m. on the 2nd the same stations were warned to expect a fresh easterly gale, in advance of a small cyclone then developing over Michigan, which as it neared the Maritime Provinces became an important storm. Early on the 3rd the wind increased to a fresh gale on the Bay of Fundy and extended during the day over the whole maritime district, being accompanied by a general fall of sleet and rain. The wind, which at first came from the S.E., gradually veered, as the cyclone moved eastward, to the W. and S.W.

No. 3. All Bay of Fundy stations, also Liverpool and Halifax, were warned at 10 p.m. on the 7th to expect a fresh easterly gale. Two small depressions at the time were visible, one over eastern New York and the other off the middle Atlantic coast. Next morning these had coalesced and apparently dispersed during the day off the coast. Early on the 8th there was a considerable E. and N.E. gale on the Bay of Fundy.

No. 4. All Atlantic coast stations south of the Gut of Canso and Bay of Fundy stations were warned at 10.30 a.m. on the 20th for a moderate S.E. to S.W. gale. At the time an anticyclone of some importance combined with low pressure over the Lakes was causing steep barometric gradients over the eastern portion of the Lake District. During the 21st and 22nd a moderate gale prevailed in the Bay of Fundy and southern portion of Nova Scotia, which, coming at first from the S.E., eventually veered to N.W. as the depression over the Lakes passed across the country and off the coast.

No. 5. At 10 p.m. on the 24th stations in Northumberland Strait along the Atlantic coast and in the Bay of Fundy, were warned for a moderate gale from the S. and W. An important cyclone was central over Lake Superior at night. During the 25th and 26th a moderate gale from the S. and W. prevailed over the greater portion of the maritime district as the cyclone passed eastward across this district.

TORONTO OBSERVATORY. MAGNETIC REVIEW FOR FEBRUARY, 1891.

A slight disturbance prevailed on the 1st. The following three days were much quieter. After 2 a.m. of the 5th the magnets became a little unsteady and continued so to 2 a.m. the following morning. They were again in a similar condition on the evening of the 6th. Nothing of importance was recorded until the morning of the 9th, when a disturbance commenced; previous to 10 a.m. the declination magnet moved steadily west until 11.15 a.m., it then became quieter until 6 p.m., when the movements increased and the disturbance continued until 10.40 p.m. On the 10th the magnets were unsteady all day, still there were no important changes recorded. The 11th was much more disturbed, the most prominent movement was an easterly swing of 32' at 10.25 p.m., followed at 10.45 p.m. by a westerly increase of 14'; the magnet then slowly regained its normal reading, but still remained slightly disturbed. On the 11th, after 8 p.m., the h. f. steadily decreased until 10.40 p.m., when a sharp increasing swing set in, a marked maximum taking place at 10.50, after which the magnet gradually took up its normal reading. At 10.40 p.m. of the 11th a decrease of the v. f. component was shown. Disturbing action was maintained up to the morning of the 15th, it was more active on the 14th and 15th, in fact it was the most important disturbance we have had recorded at the Observatory for some time.

The maximum reading occurred at 5 a.m., the reading then being 32' above the normal, and the greatest easterly reading at 1.57 a.m., the range being 56'2. Both forces were generally decreased throughout the disturbance, and after 6 a.m. of the 15th were slightly above their respective normals.

Slight disturbance commenced on the morning of the 16th, and was visible during the following three days. This was followed by a period of quietness lasting until 10 p.m. of the 22nd, when another minor disturbance appeared and lasted until 10 a.m. of the 25th. On the 26th, at 10 a.m., the magnets again became unsteady and slight disturbing action was visible to the end of the month; the afternoons and evenings were however generally quiet.

Auroral light was observed on the 11th, class (IV.), also on the 14th. On the 1st, 3rd, 4th, 6th, 10th, 12th, 18th, 21st, 26th, 27th and 28th, the sky was clear but no aurora was observed; on all other nights clouds or haze would have hidden any aurora which might have existed. On the 11th, 12th, 13th and 14th, aurora was generally observed throughout the Dominion.

CHARLES CARPMAEL,

Director.

METEOROLOGICAL OFFICE,
TORONTO, 6th April, 1891.

METEOROLOGICAL SERVICE, DOMINION OF CANADA.

Monthly Weather Review.

MARCH, 1891.

INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraphic reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief Signal Officer, Washington, D.C.

ATMOSPHERIC PRESSURE.

The average pressure, as determined from the observations taken at telegraph reporting stations, was everywhere above the normal of seventeen years. The excess above normal was particularly marked in Quebec and the Maritime Provinces, and at some stations exceeded 0.2 of an inch.

March was chiefly remarkable for the erratic movements of the low pressure areas. Twelve were of sufficient importance to be traced, and they travelled over almost all parts of the continent and from all kinds of directions.

The distribution of pressure throughout Canada during the 1st and 2nd was entirely anticyclonic, the pressure being generally very high. The weather was fine, attended by excessive cold, minima being recorded 34 in the Northwest Territories, -42 on the north shore of Lake Superior, -20 in the Parry Sound district and the Ottawa Valley, -12 in Quebec and 6 in the Maritime Provinces.

These conditions were interrupted between the 3rd and 5th from the Lakes to the Atlantic by the advance of a depression from the Southwest States, which as it passed into the Lake Region and subsequently with less energy over the New England States and along our Maritime coast, brought a heavy fall of snow together with a gale of wind, more severely felt from the eastward than from the other directions. Along the St. Lawrence and the Metapedia Valleys the snowfall was heavier and the gale of greater force than elsewhere.

The anticyclonic conditions which meanwhile had obtained in the Northwest, attended by a continuance of the excessive cold, minima of -42 being recorded, again spread to the Atlantic in rear of the disturbance, and lasted until the 8th, the weather, with the exception of a light snowfall over a portion of Ontario on the 6th, being fine, and the temperature, although higher from the Lakes to the Atlantic than in the Northwest, was as a rule below average, minima being recorded on the night of the 5th, of -14 at Parry Sound, -2 at Saugeen, and -6 at Rockliffe.

An area of low pressure which appeared in the vicinity of the Gulf of Mexico on the 6th, having apparently prior to this passed over the South Pacific States, then travelled northward and over Lake Superior. At the same time a subsidiary formed and moved up the Atlantic coast and over the New England States to Quebec and the Gulf of St. Lawrence, and still another depression travelled over the Northwest and eventually dispersed in the Upper Lake Region. These cyclonic movements gave much higher temperatures throughout Canada; also on the 6th, a fall of snow occurred from the Rockies to Manitoba, together with strong winds and gales, and between the 6th and 10th sleet and rain fell generally from the Lakes to the Atlantic. Again, during the night of the 11th snow and rain occurred in the Lower Lake Region, and on the 12th it rained heavily along the St. Lawrence Valley.

During the night of the 12th an important disturbance developed with great rapidity in a trough of low pressure which stretched from the Gulf of Mexico to Maryland. It at first travelled north-northwesterly to Lake Erie, and then northeasterly along the St. Lawrence Valley, reaching its maximum on the evening of the 13th, when, in the Ottawa Valley, barometer reduced to sea-level at Rockliffe 28.98 inches. Its effect was to cause a heavy westerly gale in Ontario and portions of Quebec, and a storm of less severity in the Maritime Provinces. Precipitation occurred generally

in Ontario, chiefly confined to snow, which was especially heavy in the Muskoka and Parry Sound districts, and there was heavy rain, turning to snow in some places, in Quebec and the Maritime Provinces.

An anticyclonic system moved into the Northwest Territories on the 10th, and was accompanied there until the 13th by fine and moderately cold weather, except during the night of the 12th, when temperatures fell from -20 to -30 . It then passed southeast to the Middle Atlantic coast, and gave its fine and colder weather in Ontario on the 14th, and during the following day in Quebec and the Maritime Provinces.

Between the 14th and 17th a shallow depression, which however developed considerable energy when passing into the Gulf of St. Lawrence, as well as an area of high pressure of some importance followed one another with rapidity over the Northwest Territories and the Lake Region to our Atlantic coast. Light snowfalls attended the depression throughout its course, and colder weather and strong winds the high area, the weather conditions being most marked on the Lower St. Lawrence and the Gulf, where the snowfall was heavier and a northwesterly gale of short duration prevailed. The minima recorded were -18 to -24 in Manitoba, -30 on the north shore of Lake Superior, -16 in the Parry Sound District, and -22 in the Ottawa Valley.

Another anticyclone then passed over Canada, accompanied by fine cold weather; it was, however, preceded in Ontario on the 17th by a light fall of snow or sleet, caused by a depression to the Southwestward, also on the 18th in Quebec and the Maritime Provinces by another small depression which gave light falls of snow or rain.

Although this anticyclone afterwards hung persistently over our Eastern Atlantic coast and Newfoundland from the 20th until the 24th inclusive, the distribution of pressure elsewhere was cyclonic. In the first place the depression which had been in the Southwestward moved into the Lower Lake Region and dispersed; a second disturbance covered the Northwest on the 18th and 19th, and then passed southeast to the Middle Atlantic coast, skirting the southern portion of the Lower Lakes, and a third one on the 21st travelled from our Northwest to the Upper Mississippi Valley and then easterly over Canada to the Gulf of St. Lawrence. Along our Atlantic coast no precipitation occurred until the 23rd, then it was confined chiefly to a few showers of rain or snow; elsewhere in Canada, however, unsettled weather prevailed generally during this interval and snow or rain frequently occurred, although not in any large amounts.

An area of high pressure which afterwards made its influence felt over the greater portion of Canada for rather a lengthy period moved into the Northwest on the 22nd, apparently from the Northward. On the 23rd it was central in the Qu'Appelle Valley as an important system, barometer reduced to sea level 30.70 inches. It was accompanied by fine, cold weather, the minima recorded being -18 at Qu'Appelle, -12 at Minnedosa. It then spread quickly throughout Canada, its centre being transferred to the Upper Lakes and the Ottawa Valley, where it hovered, hitting at times a little eastward or westward until the 30th, when it made a more decided easterly movement, and on the 31st lay over the Lower St. Lawrence Valley and the Maritime Provinces.

The interruptions to the fine weather which, as a rule, prevailed from the Lakes to the Atlantic during this protracted period, were a moderately heavy fall of snow and rain in the western part of the Lower Lake Region on the 27th, as an extended disturbance travelled the Mississippi Valley to Indiana, and then quickly changed its course to east-southeast and passed off the Middle Atlantic coast, a heavy rain over the greater portion of Ontario on the 31st, as a deep cyclonic system moved into the Lake Region from the westward, and light falls of snow or sleet in the eastern half of the Maritime Provinces on the 28th and 30th, caused by depressions passing some distance off the coast. Temperature varied but slightly from normal, except in Ontario and Quebec, on the 28th and 29th, when it was much in excess of its average, maxima of from 50 to 54 being generally recorded. High winds were experienced on the 27th from the eastward, in the Lake Region, and from the northwestward in the Maritime Provinces; again on the 31st high easterly winds prevailed over the lakes.

In the Northwest Territories and British Columbia during the last week of the month the distribution of pressure alternated between cyclonic and anticyclonic. Temperature was generally in excess of its average, and with the exception of a few local falls of snow or rain, more especially on the 28th, 30th and 31st, the weather was generally fair.

TEMPERATURE.

The average temperature, as determined from the observations taken at telegraph reporting stations, was slightly above the normal for seventeen years to the east of the great lakes, but below the normal to the west.

The highest and lowest temperature in each Province during March were:—

B. Columbia, 60° on 23rd at Quamichan; -12° on 2nd at Barkerville.

N. W. Territories, 58° on 25th at Calgary; -30° on 5th at Pheasant Forks.

Manitoba, 55° on 26th at Oak Bank; -41° on 2nd at Minnedosa.

Ontario, 60° on 26th at Little Forks; -42° on 1st at White River.

Quebec, 57° on 23rd at Huntingdon; -15° on 2nd at Richmond.

N. Brunswick, 57° on 30th at Bathurst; -18° on 3rd at Fredericton and Chatham.

N. Scotia, 60° on 24th at Truro; -3° on 26th at Truro.

P. E. Island, 48° on 14th at Georgetown; -9° on 3rd at Kilmahumag.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION, &c.—Continued.

[illegible]

[illegible]

STATIONS NOT ENTERED IN FEBRUARY REVIEW.

PROVINCE.	STATION.	MEAN TEMP.	HIGHEST TEMPERATURE.		LOWEST TEMPERATURE.		PRECIPITATION.		AURORAS.	THUNDER STORMS.
			Temp.	Date.	Temp.	Date.	Amount.	Days.		
		°	°		°		in.			
British Columbia	Barkerville.....	4 63	26 0	4-6	-26 0	1	1 61	9		
	Fort Simpson.....	30 01	43 0	3	12 6	14	6 13	11		
N. W. Territories.....	Oonikap	- 9 44	18 5	17	-45 0	1	0 80	14		
Ontario	Woodstock	28 11	49 0	11	- 8 0	17	3 83	15		

PRECIPITATION.

The rainfall in part of Eastern Ontario and Quebec is slightly above the average, in the other parts of Ontario and in general throughout the Dominion it has been considerably below the average.

The distribution is as follows :—

ONTARIO— In the West and South-West District it was 1 48 in., or 0 29 in. below the average. In the North and North-West District it was 0 50 in., or 0 49 in. below the average. In the Central District it was 1 43 in., or 0 02 in. above the average, and in the North-East and East District it was 2 44 in., or 1 46 in. above the average.

In QUEBEC it was 1 15 in., or 0 41 in. above the average.

In NEW BRUNSWICK it was 1 46 in., or 0 46 in. below the average.

In NOVA SCOTIA it was 1 64 in., or 0 79 in. below the average.

In P. E. ISLAND it was 0 93 in., or 0 88 in. below the average.

In MANITOBA no rain has fallen.

In N. W. TERRITORIES at some stations about three tenths of an inch has fallen.

In B. COLUMBIA as a whole 3 60 in. has fallen ; along the coast range the fall amounted to over 7 in. ; in the interior little has fallen, and the snowfall has only been moderate.

Rainfall 5 in. and upwards during month :

B. COLUMBIA. Maple Grove, 6 51 in. ; Fort Simpson, 7 37 in. ; Port Moody, 7 30 in.

BERMUDA, 6 52 in.

Rainfall 1 in. and upwards in 24 hours :—

2nd, Bermuda, 1 02 in.

9th, Maple Grove, 1 00 in. ; Huntingdon, 1 22 in. ; Port Moody, 1 02 in. ; Ottawa, 1 21 in.

10th, Point Lepreaux, 1 00 in.

13th, Glastonbury, 1 00 in. ; Dorchester, 1 73 in. ; Parker's Ridge, 1 65 in.

14th, Truro, 1 15 in. ; Port Moody, 1 05 in. ; Yarmouth, 1 38 in. ; Fredericton, 1 33 in.

15th, Fort Simpson, 1 03 in.

20th, Sharon, 1 60 in. ; Quamichan, 1 50 in. ; Port Moody, 1 90 in.

21st, Maple Grove, 1 38 in. ; Bermuda, 1 00 in.

23rd, Port Hope, 1 13 in. ; Ennismore, 1 11 in. ; Glastonbury, 2 00 in. ; Shannonville, 1 00 in. ;

Rockliffe, 1 33 in. ; Bermuda, 1 83 in.

26th, Blenheim, 1 15 in. ; Fort Simpson, 1 07 in.

31st, Thedford, 1 71 in. ; Watford, 1 30 in. ; Winona, 1 00 in. ; Dealtown, 1 01 in. ; Lyons, 1 45 in. ;

Cottam, 1 34 in. ; Stoney Creek, 1 04 in.

Snowfall in the same district as the rainfall :

B. COLUMBIA. 5 8 in., or 1 6 in. below the average.

N. W. TERRITORIES. 6 1 in., or about 1 in. more than March, 1890.

MANITOBA. 4 1 in., or 1 7 in. below the average.

ONTARIO. 13 4 in., 4 4 in. below the average ; 21 8 in., or 2 0 in. above the average ; 17 7 in., or 3 4 in. below the average ; 23 1 in., or 2 2 in. above the average.

QUEBEC. 10 1 in., or 0 2 in. below the average.

N. BRUNSWICK. 12 7 in., or 8 5 in. below the average.

N. SCOTIA. 8 4 in., or 0 0 in. below the average.

P. E. ISLAND. 5 8 in., or 7 7 in. below the average.

Snowfall 15 in. and upwards during month :—

B. COLUMBIA.—Barkerville, 23 in.

ONTARIO.—Sault Ste. Marie, 41 in. ; Egremont, 38 in. ; Novar, 32 in. ; Beatrice, 29 in. ; Gravenhurst, 29 in. ; Alton, 15 in. ; Bancroft, 24 in. ; Point Clark, 19 in. ; Norwood, 18 in. ; Stoney Creek, 18 in. ; Toronto, 19 in. ; Goderich, 20 in. ; St. Mary's, 33 in. ; Uplands, 30 in. ; Pelée Island, 16 in. ; Lakefield, 28 in. ; Joly, 31 in. ; Lucknow, 17 in. ; Ridgetown, 16 in. ; Owen Sound, 41 in. ; Axe Lake, 22 in. ; Zurich, 18 in. ; Whiteside, 27 in. ; Sprucedale, 30 in. ; Birnam, 19 in. ; Midland, 25 in. ; Wiarton, 28 in. ; Georgetown, 24 in. ; Denbigh, 20 in. ; Glastonbury, 19 in. ; Lyons, 16 in. ; Midlothian, 27 in. ; Cowal, 18 in. ; Orangeville, 35 in. ; Nelson, 16 in. ; Ennismore, 18 in. ; Aurora, 21 in. ; Princeton, 15 in. ; Port Hope, 31 in. ; St. Thomas, 19 in. ; Wilton Grove, 16 in. ; Orillia, 41 in. ; Presqu'Isle, 19 in. ; Coldstream, 21 in. ; Oliver's Ferry, 16 in. ; Haliburton, 19 in. ; Georgina, 24 in. ; Peterborough, 34 in. ; Woodstock, 23 in. ; Heron Bay, 17 in. ; Sharon, 19 in. ; Nepigon, 18 in. ; Bognor, 32 in. ; Shannonville, 19 in. ; De Cewsville, 16 in. ; Buda, 20 in. ; Savanne, 24 in. ; London, 23 in. ; Guelph, 19 in. ; Durham, 52 in. ; Coldwater, 62 in. ; Deseronto, 23 in. ; Lindsay, 32 in. ; Alexandria, 16 in. ; Conestogo, 15 in. ; Rockliffe, 34 in. ; Parry Sound, 27 in. ; Kingston, 19 in. ; Port Stanley, 20 in. ; Saugeen, 29 in.

QUEBEC.—Point des Monts, 62 in. ; Anticosti, 22 in. ; Richmond, 15 in. ; Cape Magdalene, 22 in.

N. BRUNSWICK.—Point Escuminac, 16 in. ; Parker's Ridge, 24 in. ; Dorchester, 28 in. ; Chatham, 18 in. ; St. Andrews, 23 in. ; Fredericton, 17 in.

NOVA SCOTIA.—Truro, 19 in.

NEWFOUNDLAND.—St. John, 36 in.

Snowfall 5 in. and upwards in 24 hours :—

1st, Point des Monts, 8 in. ; Truro, 6 in. ; St. Andrews, 5 in.

3rd, Oliver's Ferry, 7 in. ; Orillia, 6½ in. ; Point Clark, 7 in. ; Pelée Island, 6 in.

4th, Presqu'Isle, 6 in. ; Port Hope, 12 in. ; Glastonbury, 9 in. ; Denbigh, 6½ in. ; St. Hyacinthe, 6 in. ; Novar, 5 in. ; Beatrice, 5 in. ; Gravenhurst, 8 in. ; Bancroft, 7 in. ; Brome, 5 in. ; Bognor, 7 in. ; Renfrew, 6 in. ; Sprucedale, 10 in. ; Owen Sound, 8 in. ; Goderich, 6 in. ; Durham, 6 in. ; Coldwater, 21 in. ; Deseronto, 6 in. ; Alexandria, 6 in. ; Rockliffe, 10 in. ; Kingston, 8 in. ; St. John, (Nfld.) 24 in. ; St. Andrews, 12 in.

5th, Wiarton, 7 in. ; Point Escuminac, 8 in. ; Anticosti, W.P., 9 in. ; Point des Monts, 7 in. ; Woodstock, 6 in. ; Richmond, 10 in. ; Parker's Ridge, 12 in. ; Whiteside, 5 in. ; Grand Manan, 7 in. ; Chatham, 7 in.

6th, Cape Magdalene, 12 in. ; Dorchester, 13 in.

8th, Nepigon, 12 in.

9th, Rockliffe, 5 in. ; Edmonton, 5 in.

10th, Point des Monts, 5 in. ; Buda, 6 in. ; Pelée Island, 10 in.

12th, Lyons, 6½ in.

13th, Novar, 5 in. ; Gravenhurst, 6 in. ; Point Clark, 8 in. ; Bognor, 8 in. ; Georgina, 10 in. ; Sombra, 7¼ in. ; Midland, 6 in. ; Wiarton, 10 in. ; Drayton, 8 in. ; Coldstream, 8 in. ; Presqu'Isle, 12 in. ; Orillia, 10 in. ; St. Thomas, 9 in. ; Aurora, 5 in. ; Cowal, 7 in. ; Wyoming, 5 in. ; North Bay, 14 in. ; Mattawa, 6 in. ; Woodstock, 6 in. ; Axe Lake, 8 in. ; Ridgetown, 6 in. ; Joly, 12 in. ; St. Mary's, 8 in. ; Goderich, 6 in. ; London, 11 in. ; Durham, 20 in. ; Coldwater, 6 in. ; Rockliffe, 5 in. ; Parry Sound, 10 in. ; Port Stanley, 17 in. ; Saugeen, 6 in.

14th, Wilton Grove, 10 in. ; Princeton, 6 in. ; Orangeville, 10 in. ; Mid-Lothian, 10 in. ; Egremont, 15 in. ; Novar, 15 in. ; Bognor, 5 in. ; Sprucedale, 11 in. ; Whiteside, 7 in. ; Owen Sound, 24 in. ; Lucknow, 6 in. ; Uplands, 6½ in. ; St. Mary's, 8 in. ; Goderich, 5 in. ; Coldwater, 7 in. ; Conestogo, 5 in. ; Woodstock, 6 in.

15th, Port Hope, 6 in. ; Fleming, 6 in. ; Roseberry, 6 in. ; Norwood, 6 in. ; Cartier, 6 in. ; Sprucedale, 5 in. ; Axe Lake, 6 in. ; Durham, 6 in.

16th, Fleming, 5 in. ; Point des Monts, 9 in.

17th, Midland, 7 in. ; Wiarton, 7 in. ; Orillia, 7½ in. ; Ennismore, 6 in. ; Sault Ste. Marie, 17 in. ; Durham, 7 in. ; Truro, 6 in.

18th, Alexandria, 7 in. ; Aurora, 5 in. ; Orangeville, 5½ in. ; Glastonbury, 6 in. ; Egremont, 7 in. ; Shannonville, 6 in. ; Owen Sound, 6 in. ; Lakefield, 7 in. ; Huntingdon, 6 in. ; Coldwater, 12 in. ; Deseronto, 5 in.

19th, Oliver's Ferry, 5 in. ; Stony Creek, 5 in.

- 21st, Ennismore, 5 in. ; Norwood, 8 in. ; Lakefield, 5 in. ; Rockliffe, 5 in.
 22nd, Burnside, 6 in.
 23rd, Point des Monts, 17 in.
 24th, Point des Monts, 5 in.
 27th, Lyons, 6 in. ; St. John (Nfld.), 8 in.
 28th, Alexandria, 7 in.
 29th, Alexandria, 5 in.
 31st, Sault Ste. Marie, 9 in.

Aurora recorded on

The class of aurora, if noted by Observer, is given (I) being the brightest, (IV) the feeblest in brilliancy.

- 1st, Pembina, II ; Savanne.
 2nd, Pembina, II ; Russell, IV ; Fort Ellice, I ; Posen, IV ; Savanne, Durham, IV ; Truro, IV ; Chicoutimi, IV.
 3rd, Russell, III ; Posen, II ; Savanne, Peterboro', II ; Dorchester, St. Albans, II ; Truro, IV ; Portage la Prairie, III ; Fredericton, III ; Virden, IV.
 4th, Posen, IV ; Savanne.
 5th, Pembina, III ; Gravenhurst, IV ; Savanne, Sharon, IV ; Durham, IV ; Virden, IV.
 6th, Pembina, II ; Egremont, IV ; Chicoutimi, IV ; Virden, IV.
 7th, Chicoutimi, IV.
 9th, Posen, IV ; Savanne.
 10th, Russell, IV.
 11th, Cook's Mills, Zurich, III.
 12th, Thedford, Novar, II ; Banff, IV ; Fort Ellice, I ; Brandon, IV ; Egremont, IV ; Posen, IV ; Gravenhurst, IV ; Alton, II ; Sharon, II ; Georgetown, P. E. I., Haliburton, IV ; Joly, IV ; Uplands, St. Albans, III ; Durham, IV ; Bancroft, IV.
 13th, Truro, III ; Minnedosa, III.
 14th, Mid-Lothian, II ; Hillview, Pembina, III ; Russell, III ; Cotham, II ; Novar, IV ; Fort Ellice, IV ; Gravenhurst, IV ; Cook's Mills, Gladstone, I ; Axe Lake, I ; Joly, IV ; Truro, IV ; Bancroft, IV.
 15th, Point Escuminac, Hillview, Pembina, II ; Cotham, III ; Fort Ellice, IV ; Truro, IV ; Minnedosa, III ; Virden, I.
 16th, Novar, IV ; Savanne, Sharon, IV ; Joly, IV ; Little Forks, III ; Saugeen, IV.
 17th, Posen, II ; Minnedosa, IV ; Chicoutimi, IV.
 18th, Savanne, Edmonton, IV.
 23rd, Pembina, I ; Russell, IV ; Fort Ellice, I ; Posen, III ; St. Albans, III.
 24th, Hillview.
 26th, Minnedosa.
 27th, Posen, IV.
 29th, Elora.
 30th, Alexandria, II ; Father Point, III ; Quebec, III ; Chicoutimi, III ; Mid-Lothian, III ; Russell, II ; Cotham, I ; Novar, IV ; Banff, IV ; Kamloops, Fort Ellice, I ; Elora (brighO), Gravenhurst, IV ; Alton, II ; Richmond, IV ; Sharon, I ; Peterboro', I ; Haliburton, IV ; Joly, IV ; Kingston, IV ; Virden, IV.
 31st, Georgetown, III ; Banff, IV ; Kamloops, Richmond, IV ; Parker's Ridge, I ; Dorchester, I ; Alexandria, III ; Yarmouth, IV ; Father Point, III ; Quebec, III ; Chicoutimi, IV ; Virden, IV.

MIGRATION OF SPRING BIRDS.

Robins Thedford, 2nd ; Birnam, 3rd ; Kingsville, 8th ; Zurich, 9th ; Stoney Creek, 11th ; Elora, 11th ; Port Moody, 15th ; St. Mary's, 18th ; Lucknow, 20th ; Paris, 21st ; Midland, 22nd ; Winona, 23rd ; Point Clark, 23rd ; Alton, 23rd ; Axe Lake, 23rd ; DeCewsville, 26th ; Bognor, 28th ; Warton, 29th ; Egremont, 29th ; Norwood, 29th ; Beatrice, 30th ; Presqu'Isle, 30th.

Meadow Larks Kingsville, 11th ; Thedford, 19th ; Point Clark, 21st ; Scarboro', 24th ; Stony Creek, 26th ; Sombra, 26th ; Winona, 28th ; Egremont, 29th.

Blue Birds Port Moody, 7th ; Stoney Creek, 11th ; Cottam, 11th ; Ridge town, 18th ; Sombra, 20th ; Winona, 20th ; Scarboro', 24th ; DeCewsville, 26th ; Point Clark, 26th ; Banff, 27th ; Lucknow, 27th ; Egremont, 29th.

Black Birds—Cottam, 12th ; DeCewsville, 17th ; Georgetown, 23rd ; Winona, 23rd ; Sombra, 23rd ; Ridgetown, 25th ; Birnam, 25th ; Point Clark, 27th ; St. Mary's, 29th ; Egremont, 31st ; Elora, 29th.

Grey Birds—Winona, 23rd.

Crows—Sharon, 1st ; Peterboro', 1st ; Richmond, 2nd ; Nelson, 7th ; Lucknow, 9th ; Brome, 10th ; St. Mary's, 10th ; Point Clark, 11th ; Shannonville, 11th ; Haliburton, 12th ; Sombra, 18th ; Axe Lake, 18th ; Paris, 21st ; Manitou, 26th ; Hillview, 28th.

Geese—Kilmahumaig, 8th ; DeCewsville, 12th ; Cottam (Ass.), 23rd ; Rosebury, 27th ; Manitou, 29th ; Westbourne, 29th ; Portage la Prairie, 29th ; Fort Ellice, 31st.

Duck—Banff, 31st.

Song Sparrow—Egremont, 31st.

Hawks—Stony Creek, 11th.

Swallow—Quamichan, 10th.

Frogs—Zurich, 12th ; Esquimalt, 13th ; Stony Creek, 23rd ; DeCewsville, 23rd ; Cottam, 23rd ; Kingsville, 26th ; Lucknow, 27th ; Birnam, 28th.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF MARCH, 1891.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
WINNIPEG.....			0 16	0 52	0 63	0 72	0 72	0 73	0 77	0 77	0 73	0 68	0 51	0 01	..	..
.....																
.....																
KINGSVILLE.....			01	22	34	38	39	44	48	43	40	33	21	04	..	..
WOODSTOCK.....			03	17	29	35	39	34	34	36	36	37	24	02	..	..
TORONTO.....			12	43	50	48	47	44	38	39	41	43	38	38	8.	..
LINDSAY.....			22	40	44	55	53	53	50	47	45	42	40	37	12	..
BARRIE.....			21	35	48	59	46	44	46	45	46	46	28	01	..	..
KINGSTON.....			20	46	59	60	56	54	58	53	47	45	35	05	..	..
.....																
.....																
CORNWALL.....																
MONTREAL.....		02	34	54	53	51	60	66	64	64	52	50	24	..	..	..
FREDERICTON.....			20	38	48	57	51	50	50	53	54	59	53	27	..	..
SYDNEY.....			04	24	34	34	31	52	33	31	26	23	17	05	..	..
			WINNIPEG.			KINGSVILLE.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.			MONTREAL.	FREDERICTON.	SYDNEY.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)			0 58			0 31	0 27	0 38	0 45	0 33	0 45			0 53	0 47	0 25
MAXIMUM DAILY AMOUNT.....			0 90			0 86	0 83	0 95	1 00	0 92	0 93			0 99	0 91	0 92
DATE.....			12			10	11	26	1	1	1			1	27	11
NO. OF DAYS COMPLETELY CLOUDED.....			2			11	10	8	9	6	6			6	4	12

PROBABILITIES.

The probabilities issued by this office at 11 p.m. each evening are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 527. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage Fully.
LOWER LAKE REGION.....	112	89	29	12	89.4
UPPER ST. LAWRENCE	103	79	12	12	82.5
LOWER ST. LAWRENCE.....	100	83	7	10	86.5
GULF.....	101	73	18	10	81.2
MARITIME PROVINCES	111	78	25	8	81.5
TOTAL.....	527	393	82	52	82.4

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by 2 and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at the "Probability Stations," as well as the telegraphic reports, are used.

The daily probabilities and storm warnings were issued by Probability Officer B. C. Webber.

STORM WARNINGS.

During the month warnings on the approach of three storms were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 36, of which 17, or 47.2 per cent., were verified. At 11 stations, however, the force did not reach that indicated by the signals displayed; 3 stations reported warnings received late, owing to delay in transmission.

In connection with the warnings, predictions as to the probable direction of the winds were given and of the 17 warnings verified as to force, 12, or 70.6 per cent., were fully verified, and 17, or 100 per cent. were fully and partially verified as to direction.

1. At 11.35 a.m. of the 3rd, signal No. 3 was ordered for stations on the Bay of Fundy, owing to developing depressions over the Mississippi Valley and off the Middle Atlantic coast. The development continued with a northeastward movement, and at 10.15 p.m. the warning was extended to other stations in Nova Scotia and Cape Breton. Strong winds and moderate gales with a snowstorm prevailed during the night of the 4th, while the disturbance was passing to the southward of Nova Scotia, and during the following afternoon there was a strong northwesterly blow in the western portion of the Maritime Provinces. Signals were lowered on the 5th.

2. On the 9th, at 10 p.m., signal No. 7 for a moderate gale at first from the eastward was displayed at stations in the Maritime Provinces; this was on account of a depression over the Lake Region and the apparent development of a subsidiary on the Middle Atlantic coast. The former dispersed while the subsidiary moved across the New England States, and during the night of the 9th and early part of the 10th there were strong southeast and southwest winds, with rain in the Maritime Provinces. Signals were lowered late on the 10th.

3. During the 13th there was an important storm moving northward across the Lake Region, and at 9.25 p.m. signals for a fresh gale veering from southeast to southwest were ordered for Maritime stations. The storm centre moved northeast from the Ottawa Valley, and to the northward of the Gulf with diminishing energy. During the afternoon of the 13th a moderate to fresh gale from the southeast and southwest, with rain, set in in the Bay of Fundy, and during the night a moderate storm was experienced in most of the other portions of the Maritime Provinces. Signals were lowered on the 14th.

TORONTO OBSERVATORY—MAGNETIC REVIEW FOR MARCH, 1891.

The month was remarkable for the number of disturbances, being the largest number registered at the Observatory for some time past.

The magnets remained unusually steady until 8.30 p.m. of the 1st, the declination magnet then taking a sudden westerly hitch, followed immediately by an easterly swing, the forces at first showing an increase, followed by a decrease. In about an hour's time the magnets were much quieter. On the morning of the 2nd sharp little vibrations set in and continued until 3 p.m. of the 2nd; between 1 and 2 p.m. the declination magnet moved considerably west, a marked maximum taking place at 1.42 p.m.; the magnet then trended east, and after 2 p.m. several important swings took place. After 2 p.m. of the 2nd both forces were rapidly increased, notably the horizontal component, which attained its maximum reading at 2.17 p.m. At 4 p.m. the magnets were at their normal readings and steady.

After 6 p.m. disturbing action again set in but did not assume an important character until 2.10 a.m. of the 3rd, the horizontal force magnet then suddenly increased its reading. From the 3rd to 10 a.m. of the 6th the magnets were in a disturbed condition, the movements being generally slow and undulating, and the most important change recorded was a bold easterly sweep of the declination magnet at 7.20 p.m. of the 3rd, the change amounting to 18', a marked minimum being shown at 7.50 p.m. The minimum reading for the next day occurring exactly at the same time.

After 8 p.m. of the 6th slight disturbing action again began and was visible up to 4 a.m. of the 8th, and became less active again during the night of the 9th. There was nothing of importance then shown until the 12th, when a moderate disturbance was recorded. Between noon and 5.45 p.m. the declination magnet moved gradually west; it then turned east, the magnet moving slowly at first, but soon the motion was accelerated, the easterly extreme taking place at 7.13 p.m., the reading being then 27' east of the normal; it then quickly rose to its mean reading and continued disturbed until 10 p.m. The magnet kept below its normal value until 10 a.m. of the 13th. Both forces were changing considerably on the evening of the 12th; a steady increase of the vertical component was noticed during the afternoon and evening of the 12th. After 6 p.m. a quicker increase set in, and after 8 p.m. it began to diminish until 4 a.m. of the 13th. On the 14th, between 5.30 and midnight, a moderate disturbance was felt; the declination magnet was the most affected and the principal movement was shown after 8 p.m., as an easterly sweep of 30', the extreme taking place at 8.49 p.m. Slight disturbance continued throughout the 15th. On the 16th it became more important and continued without interruption until the afternoon of the 18th. The most prominent deflection took place between 0.53 and 2.15 a.m. of the 16th; the range was 25'; the extreme westerly was recorded at 1.22 a.m., and the easterly fifty-one minutes afterwards. The movements were slow, except on the mornings of the 16th and 17th, when the magnets were moving in short vibrations.

From the 18th to the 22nd the curves were about normal, with the exception of slight disturbances during the night hours, lasting a short time. Previous to 2 a.m. of the 23rd the declination needle moved slowly east attended by a decrease of both forces; shortly after 2 a.m. the magnet moved west for half an hour; it then gradually took up its normal reading, but remained slightly disturbed until 8 a.m. of the 28th; during the night and early morning hours the disturbance was decidedly more active, the magnets showing a tendency to quiet down during the afternoon. A quiet period set in at 8 a.m. of the 28th, and the magnets were moving regularly up to the 29th. Slight disturbance sprung up on the 30th, and on this night the movements increased and culminated on the 31st in the largest disturbance of the month; its activity was principally felt between 5.45 and 6.30 p.m.; at 5.45 p.m. the declination magnet started on an easterly swing, and by 6.03 it had moved 51'; a retrograde movement then commenced, and by 6.20 it changed a similar amount. The force magnets felt this disturbance considerably; after 4 p.m. the vertical component gradually increased until 5.40, when a quick increasing swing brought it to its maximum at 5.55 p.m.; a sharp diminution then followed bringing the magnet to about its normal reading; it only remained there for a brief period, for a marked increase of force followed, lasting until 6.30 p.m., when a gradual diminution of force then commenced, and continued until midnight. The horizontal component shows a remarkably sudden increase, starting at 5.40, a distinct maximum being shown at 5.58 p.m.; by 6.05 p.m. it had regained its usual position; the amount of increase was .0026 c.g.s. After 8 p.m. the disturbance became less active, and the month closed with a slight disturbance.

Auroral light was observed on the 30th at 10.15, clouds partially clearing away disclosing an auroral arch and a few short streamers.

On the 1st, 5th, 7th, 10th, 11th, 13th, 14th, 16th, 23rd, 24th, 25th, 28th and 29th the sky was clear, but no aurora was observed; on all other nights clouds or haze would have hidden any aurora which might have existed. On the 30th and 31st brilliant auroras were generally observed throughout Canada, a number of them Class (I).

CHARLES CARPMAEL,

Director.

METEOROLOGICAL OFFICE,

TORONTO, May 5th, 1891.

Monthly Weather Review.

APRIL, 1891.

INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraphic reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief Signal Officer, Washington, D.C.

ATMOSPHERIC PRESSURE.

The average pressure, as determined from the observations taken at telegraph reporting stations, was not far from, but little below normal of seventeen years over the whole country.

Important anti-cyclonic conditions covered the whole Northwest, accompanied by cold weather at the commencement of the month. A smaller anti-cyclone also covered eastern Canada, where it was fine and cool.

Over the Lakes the type was generally cyclonic and extended to the Gulf of Mexico.

A marked development took place over the Lakes, and a general rainfall occurred on the 2nd. On the 3rd snow set in with a high northerly wind and colder weather. By this time the cyclone had developed considerably and moved to the Atlantic coast, being at 8 p.m. central near Sandy Hook.

A general and heavy rainfall with an E. to S. gale prevailed on the 3rd over the greater portion of the Maritime District, while a N. E. gale and snow extended throughout Quebec and northern portion of New Brunswick. From Sandy Hook the storm moved N.N.E. to the Gulf of St. Lawrence, where it hovered and slowly dispersed.

Anti-cyclonic conditions followed over the Lakes and slowly extended to eastern Canada, and a period of fair weather with cool days and frosty nights, and a general tendency to fresh W. to N.W. winds were the rule until the 10th, excepting a few hours on the 7th, when a small depression which suddenly appeared off the Cape Breton coast caused a W. and N. W. gale and moderate snowfall in the eastern portion of the Maritime Provinces.

In the North-West the conditions remained anticyclonic, and the weather fine, with cool day temperatures and cold nights, the temperature falling to zero on the night of the 3rd. This was succeeded on the 4th by lower pressure and a general tendency for S.E. and S.W. winds and milder weather. It was showery on the 8th in Alberta and Assiniboia, some showers also falling in Manitoba on the 9th.

During the 10th a cyclone of moderate depth, which had been slowly moving eastward across the Western States, approached the Lakes. It caused a general rainfall over Ontario on the 10th and 11th, which extended over Quebec on the latter day. By the 12th the cyclone crossed Quebec and fair weather, which had continued in the Maritime district, was succeeded by rain.

There followed a short period of fair weather and higher pressure in the Lake and eastern districts, but showery weather for the most part again became the rule, excepting eastern Quebec, on the 13th, 14th and 15th, but in some places the precipitation was in the form of sleet or snow.

The 16th brought a pronounced change to anticyclonic conditions and fairer weather, but this was of short duration, as a moderate depression from the west moved across the country, giving showery weather in Ontario on the 18th and throughout Eastern Canada next day, and was generally accompanied by higher temperatures.

In the Northwest fair mild weather, with a general tendency to the cyclonic type, prevailed till the 12th, when an anticyclone and colder weather spread over the Territories; but this was succeeded by milder weather next day in Alberta.

From the 14th to the 20th it was comparatively warm throughout the Northwest. There were a few showers in Manitoba on the 17th, otherwise the weather was fair everywhere in the Territories during this period.

An important anticyclone spread over the Lake District and Eastern Canada on the 19th, where it continued till the 22nd, bringing a period of fine mild weather.

Pressure gave way everywhere on the 22nd, and a general cyclonic tendency was shown. Showers in Ontario and the Maritime Provinces and light falls of sleet and snow in Quebec occurred during the next two days.

From the 24th until the 26th cool N.W. and W. winds with fair weather were the rule everywhere.

On the 27th a cyclone passed eastward across the Lakes, crossing Eastern Canada next day, and was accompanied by higher temperature and fair weather everywhere.

Anticyclonic conditions and cooler weather followed, and there were a few light falls of snow or sleet in eastern Quebec; but on the 30th a small cyclone passed eastward across Ontario and another appeared off the Nova Scotian coast. Some local showers fell in the Lake district and Maritime Provinces, and there was a general tendency for higher temperature.

On the 20th a general rainfall took place in Manitoba, after which fair, warm weather continued until the 25th, the temperature on that day rising to 90° Fahr. at Winnipeg.

It was also warm further west until the 24th, when some showers fell in Alberta, and cooler weather set in on the 25th, which extended next day to Manitoba. From the 26th and until the 29th higher temperature and cyclonic conditions covered the Territories. Then followed cooler northwesterly winds, which continued till the end of the month, some showers falling on the 29th in Manitoba.

TEMPERATURE.

The average temperature, as determined from the observations taken at telegraph reporting stations, was above the normal for seventeen years. This was especially the case in Manitoba and the Northwest Territories, where the excess was from 4° to 10°.

The highest and lowest temperatures in each Province during April were:—

British Columbia, 77°·2 on 17th, at Kamloops; 11°·0 on 1st, at Barkerville.

N. W. Territories, 84°·2 on 23rd, at Qu'Appelle; 3°·1 on 2nd, at Prince Albert.

Manitoba, 92°·0 on 25th, at St. Alban's; 1°·0 on 3rd, at Russell and Minnedosa.

Ontario, 90°·0 on 29th, at Buda; 13°·0 on 4th, at Savanne.

Quebec, 73°·0 on 27th, at Huntingdon; 10°·0 on 6th, at Brome.

New Brunswick, 70°·0 on 28th, at Woodstock; 10°·0 on 2nd, at Chatham.

Nova Scotia, 68°·4 on 28th, at Truro; 18°·3 on 1st, at Pictou.

P. E. Island, 63°·0 on 19th, at Georgetown; 10°·0 on 2nd, at Kilmahumnaig.

ERRATA. —In March Review the lowest temperature at Minnedosa should be — 34°·9 on 4th, and the lowest temperature in Manitoba — 35°·2 at Virden on 4th.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, APRIL, 1891.

STATION.	PRESSURE IN INCHES.				TEMPERATURE OF AIR.				DIRECTION OF WIND FROM.				VELOCITY OF WIND.				PRECIPITATION.			
	Mean actual.		Mean reduced.		Winds observed.		Mean daily range.		Mean relative humidity.		Mean amount of cloud.		Direction of wind from.		Velocity of wind.		Precipitation.			
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.		
Albany.	29.55	29.35	29.21	29.12	58.4	58.8	57.4	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0		
Albany, N.Y.	29.55	29.35	29.21	29.12	58.4	58.8	57.4	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0		
Albany, N.Y.	29.55	29.35	29.21	29.12	58.4	58.8	57.4	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0		
Albany, N.Y.	29.55	29.35	29.21	29.12	58.4	58.8	57.4	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0		
Albany, N.Y.	29.55	29.35	29.21	29.12	58.4	58.8	57.4	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0		
Albany, N.Y.	29.55	29.35	29.21	29.12	58.4	58.8	57.4	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0		
Albany, N.Y.	29.55	29.35	29.21	29.12	58.4	58.8	57.4	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0		
Albany, N.Y.	29.55	29.35	29.21	29.12	58.4	58.8	57.4	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0		
Albany, N.Y.	29.55	29.35	29.21	29.12	58.4	58.8	57.4	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0		
Albany, N.Y.	29.55	29.35	29.21	29.12	58.4	58.8	57.4	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0		
Albany, N.Y.	29.55	29.35	29.21	29.12	58.4	58.8	57.4	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0		
Albany, N.Y.	29.55	29.35	29.21	29.12	58.4	58.8	57.4	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0		
Albany, N.Y.	29.55	29.35	29.21	29.12	58.4	58.8	57.4	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0		
Albany, N.Y.	29.55	29.35	29.21	29.12	58.4	58.8	57.4	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0		
Albany, N.Y.	29.55	29.35	29.21	29.12	58.4	58.8	57.4	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0		
Albany, N.Y.	29.55	29.35	29.21	29.12	58.4	58.8	57.4	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0		
Albany, N.Y.	29.55	29.35	29.21	29.12	58.4	58.8	57.4	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0		
Albany, N.Y.	29.55	29.35	29.21	29.12	58.4	58.8	57.4	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0		
Albany, N.Y.	29.55	29.35	29.21	29.12	58.4	58.8	57.4	5												

ONTARIO—*Concluded.*

Navar.....	37°2' + 2°1' 4 75°4	27	1°3	6	25°0 47°5	.....	6	9	10	2	5	5	4	5	11	10	28	90	11	V	27 S.	3°24	+0°30 12 18	4	0	0
Little Forks.....	41°6	25	1°2	3	18°8 48°8	3	4	8	3	5	5	19	11	14	21	18	8	90	11	III	21 S.W.	4°80	8°22	2	0	0
Waukegan.....	45°4 + 3°9 4 80°0	30	19°0	5	21°0 42°0	.....	5	5	3	5	5	9	8	21	11	23	0	90	1	11	4 N.W.	1°75	+0°40 4 26	0	0	0
Cook's Mills.....	37°1	27	8°4	4	19°8 30°9	.....	.....	.....	2	5	4	6	1	2	7	3	6	30	.....	.....	1°77	8°22	0	0	0	
Shannonville.....	45°0 + 2°1 2 74°0	30	20°0	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1°20	+1°50 6 24	0	0	0	

QUEBEC.

Montreal.....	29°02 30°54 29°44	1°10	42°2	2	24°17 72°0	.....	27	21°8	5	18°2 28°9	32°7 67	.....	1	5	76	62	8	73	36	241	121	78	25	720	16°2	30°3	28 W.	3°26	+0°06 16 14	3	0	1	
Burlington.....	29°02	30°15 29°14	1°01	41°3	2	22°21 73°0	.....	27	19°0	6	16°8 37°0	.....	7	11	0	2	17	1	1	43	12	8	0	84	II	IV	28 S.W.	4°44	+2°02 11 19	1	0	1	
Richmond.....	38°7	.....	.....	38°7	0°14 12°1	.....	17	12°3	6	19°9 42°6	.....	.....	6	2	0	33	0	0	0	0	0	53	1	87	V	VIII	21 N.W.	1°21	+0°24 10 20	4	0	0	
Chicoutimi.....	39°0 + 1°5 13 60°4	18	13°4	6	19°2 34°7	.....	18	13°4	6	19°2 34°7	.....	.....	6	7	4	12	1	6	6	3	16	1	17	60	.....	.....	20°7	3 N.E.	2°06	+0°76 15°5	9	0	0
Quebec.....	29°02 30°55 29°43	1°12	35°8	1	1°0 17°7 4	.....	24	15°5	10	15°2 28°2	.....	.....	6	7	11	3	5	5	6	13	0	16	1	60	.....	.....	24°6	4 S.E.	1°20	17°19	2	0	0
Grindstone.....	29°05 30°39 29°16	1°23	31°6	.....	.....	.....	24	13°4	2	10°6 31°0	.....	.....	6	12	0	0	0	0	4	3	9	1	0	27	.....	.....	3°63	.....	.....	13°17	0	0	0
St. Hyacinthe.....	42°4	.....	.....	42°4	.....	.....	27	18°0	5	19°4 36°9	.....	.....	6	12	0	0	0	0	4	3	9	1	0	27	.....	.....	2°06	+0°34 16 14	0	1	0	0	0
Broome.....	41°8	4	4	4	11 67°0	.....	22	10°0	6	16°6 31°0	.....	.....	6	11	9	1	9	1	2	6	12	31	1	0	300	.....	.....	1°63	+0°15 15 15	6	0	0	0
Father Point.....	34°4	.....	.....	34°4	1°7 15°5 7	.....	28	12°8	7	10°5 27°3	.....	.....	6	10	5	3	12	1	5	6	19	4	5	60	.....	.....	33°0	4 N.	1°63	7°23	0	0	0
Point des Monts.....	32°2	5	8	5	47°0	.....	21	22°0	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2°80	.....	7°23	0	0	0	
Anticosti, W.P.....	31°3	0°4 8 43°0	11	19°0	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1°56	.....	5°55	0	0	0	

NEW BRUNSWICK.

Fredericton.....	29°08 30°52 29°25	1°27	39°4	1	1°18 97°3	.....	28	16°3	1	19°4 33°4	29°0 65	.....	6	8	7	9	9	8	4	4	28	18	3	90	7°3	13°8	8 W.	2°05	+0°61 20 10	1	0	2	
Charlottetown.....	29°07 30°47 29°39	1°18	36°0	.....	0°6 17 65°7	.....	18	10°0	2	19°6 38°8	.....	.....	6	7	7	5	1	0	5	19	3	17	22	60	.....	.....	9°4	5 S.W.	1°30	+1°46 14 15	0	0	0
Richmond.....	29°06 30°45 29°33	1°12	39°6	2°1 17 68°0	18	11°0	6	8	3	2	29	1	2	6	3	17	26	80	11	V	25 E.	0°88	+0°71 8 22	2	0	0
St. Andrews.....	29°09 30°52 29°22	1°30	39°1	.....	0°7 17 61°7	.....	17	22°3	6	18°1 30°7	.....	.....	6	5	1	3	4	5	3	4	15	14	60	.....	.....	IV	3°5 E.	2°17	+0°22 13 17	0	0	2	
Grand Manan.....	29°09 30°51 29°26	1°25	39°5	.....	0°2 17 61°8	.....	14	23°5	6	16°1 25°0	.....	.....	6	6	4	1	5	8	9	11	16	61	.....	.....	23°9	13 W.	2°65	+0°57 16 14	0	0	4		
Point Lepreau.....	37°4	.....	.....	37°4	1°3 12°52°0	.....	30	24°0	6	17°1 25°0	.....	.....	6	7	7	9	12	5	1	15	13	16	0	78	II	IV	3 E.	3°17	+0°80 7 23	0	4	3	
St. John.....	29°08 30°68 29°26	1°42	39°3	.....	0°1 17 65°0	.....	28	20°0	1	16°0 29°0	27°3 75	.....	6	6	29	21	12	1	37	13	16	24	27	180	9°2	25°3	3 S.	1°76	+0°75 12 18	.....	0	0	2
St. John City.....	29°06 30°53 29°30	1°23	38°1	.....	1°0 31 61°0	.....	28	21°0	1	13°4	.....	.....	6	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2°45	+0°79	.....	0	0	2	
Becharof.....	34°1	.....	.....	34°1	1°4 3 62°0	.....	28	13°0	1	13°7 31°0	.....	.....	6	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1°78	+0°42 9 21	1	0	0	0	
Bathurst.....	34°1	.....	.....	34°1	2°5 12 61°5	.....	17	13°0	2	19°9 39°0	.....	.....	5	10	0	0	0	0	0	0	23	0	30	59	1	III	3 S.W.	0°91	+1°20 6 20	0	0	0	0
Parsons's Ridge.....	34°9	.....	.....	34°9	1°7 3 65°0	.....	28	15°0	2	19°4 34°0	.....	.....	6	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1°85	.....	7°23	0	0	0	0
Woodstock.....	38°3	1°7 4 70°0	28	16°0	1	18°7 35°3	.....	.....	.....	.....	.....	.....	7	12	6	2	7	4	7	3	8	15	0	52	6°5	15°7	4 E.	2°09	+0°10 11 19	1	0	0	0

NEW SCOTIA.

Halifax.....	29°08 30°46 29°30	1°16	39°4	.....	1°8 17 65°7	.....	14	21°6	1	15°0	.....	.....	6	2	45	27	16	27	24	24	25	50	2	240	7°4	18°5	3 N.E.	4°01	+0°18 16 14	0	0	0
St. John.....	29°07 30°49 29°36	1°05	35°4	.....	0°8 21 62°3	.....	18	19°0	19	15°3 30°0	29°6 79	.....	7	6	138	57	29	38	51	168	65	126	25	720	9°6	19°0	1 N.E.	5°00	+0°74 12 18	.....	.....	.....
Yarmouth.....	29°01 30°53 29°28	1°25	39°3	0°5 11 60°3	28	23°1	1	13°0 30°0	6	8	17	3	4	3	5	7	10	6	5	60	18°3	3 S.E.	3°69	+0°31 15 15	0	0	4
Toronto.....	29°05 30°43 29°36	1°07	39°4	.....	3°5 17 68°4	.....	28	19°3	10	19°3 40°4	.....	.....	7	14	14	15	0	10	11	12	16	9	7	90	II	III	30 N.W.	2°06	+0°66 16 14	1	0	0
Dieppe.....	38°6	.....	.....	38°6	1°7 13 65°0	.....	18	18°3	1	16°1 40°4	.....	.....	4	5	14	12	12	3	3	16	4	18	3	90	II	IV	30 N.W.	3°51	+1°21 7 23	0	0	1
Windsor.....	34°4	.....	.....	34°4	5°2 10 67°0	.....	28	26°0	2	.....	.....	.....	5	6	19	12	6	0	7	7	4	0	78	.....	.....	.....	1°50	.....	2°28	0	0	0
St. John's.....	37°0	0°9 7 30°0	27	20°0	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4°03	+1°17 7 23	0	0	0	
New Brunswick.....	37°0	0°9 7 30°0	27	20°0	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5°39	+2°30 9 21	0	1	0	

NEW JERSEY.

St. John.....	29°02 30°41 29°12	1°29	34°0	0°5 19 61°0	13	10°0	3	12°8 25°0	6	10	2	17	1	13	5	10	6	6	0	60	30°0	1 N.E.	5°33	+1°52 11 19	0	0	0	
Baltimore.....	30°11 0°14 29°20	0°71	65°0	24	55°2	1	10°0 14°0	5	3	11	6	2	12	3	9	6	7	4	60	17°8	29 NW	5°77	12 18	0	0	0

P. I. P. A. V.

King's.....	34°6	.....	.....	34°6	1°2 12 57°8	.....	19	10°0	2	18°6 31°7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
King's.....	36°4	.....	.....	36°4	1°6 7 61°0	.....	19	18°0	1	16°0 31°0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
King's.....	35°7	.....	.....	35°7	0°7 15 56°7	.....	28	19°1	1	13°2 28°8	.....	.....	6	8	97	79	10	42	105	130	40	135	73	720	.....	.....	18°0	50 N.	1°78	+1°07 13 17	0	0	0

P. I. P. A. V.

King's.....	34°6	.....	.....	34°6	1°2 12 57°8	.....	19	10°0	2	18°6 31°7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
King's.....	36°4	.....	.....	36°4	1°6 7 61°0	.....	19	18°0	1	16°0 31°0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
King's.....	35°7	.....	.....	35°7	0°7 15 56°7	.....	28	19°1	1	13°2 28°8	.....	.....	6	8	97	79	10	42	105	130	40	135	73	720	.....	.....	18°0	50 N.	1°78	+1°07 13 17	0	0	0

P. I. P. A. V.

King's.....	34°6	.....	.....	34°6	1°2 12 57°8	.....	19	10°0	2	18°6 31°7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
King's.....	36°4	.....	.....	36°4	1°6 7 61°0	.....	19	18°0	1	16°0 31°0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
King's.....	35°7	.....	.....	35°7	0°7 15 56°7	.....	28	19°1	1	13°2 28°8	.....	.....	6	8																		

STATIONS NOT ENTERED IN MARCH REVIEW.

PROVINCE.	STATION.	MEAN TEMP.	HIGHEST TEMPERATURE.		LOWEST TEMPERATURE.		PRECIPITATION.		AURORAS.	THUNDER STORMS.
			Temp.	Date.	Temp.	Date.	Amount.	Days.		
		°	°		°		in.			
N. W. Territories.....	Regina.....	7.91	42.0	31	-38.0	3-6	0.37	7		
	Oonikup.....	9.84	47.0	29	-32.0	2-3	0.63	8		
Ontario.....	Galt.....	25.88	50.0	29	-5.0	17	3.33	13		
	Clontarf.....	21.35	50.3	28	-18.2	2	5.57	15	14, 16, 30.	

PRECIPITATION.

The rainfall, except in Quebec, Nova Scotia and Manitoba, has been considerably below the average.

The distribution is as follows :—

In B. COLUMBIA on the coast it was 5.77 in., or about 2.17 in. above April, 1890, but in the interior almost none had fallen.

In the N. W. TERRITORIES about 0.80 in. has fallen, considerably above the amount of last year.

In MANITOBA in was 1.11 in., or 0.31 in. above the average.

In ONTARIO, West and Southwest District, it was 1.74 in., or 0.22 in. below the average. In the North and Northwest District it was 2.04 in., or 0.35 in. above the average. In the Central District it was 1.81 in., or 0.09 in. below the average, and in the Northeast and East District it was 1.49 in., or 0.17 in. below the average.

In QUEBEC it was 1.60 in., or 0.29 in. or above the average.

In NEW BRUNSWICK it was 1.30 in., or 0.74 in. below the average.

In NOVA SCOTIA it was 3.74 in., or 1.34 in. above the average.

In P. E. ISLAND it was 1.13 in., or 0.69 in. below the average.

Rainfall 5 in. and upwards during month :—

B. COLUMBIA.—Quamichan, 5.36 in. ; Agassiz, 8.14 in. ; Port Moody, 5.60 in. ; Fort Simpson, 7.42 in. ; Maple Grove, 6.85 in. ; Bermuda, 5.77 in. ; Nova Scotia, Sable Island, 5.39 in.

Rainfall 1 in. and upwards in 24 hours :—

3rd, Yarmouth, 1.25 in. ; Halifax, 1.05.

6th, Bermuda, 1.21 in. ; St. John, Nfld., 1.08 in.

11th, Durham, 2.00 in. ; Huntingdon, 1.50 in.

12th, Whiteside, 1.02 in. ; Sprucedale, 1.10 in.

14th, St. Thomas, 1.00 in. ; Princeton, 1.00 in. ; Lyons, 1.00 in. ; Sarnia, 1.00 in. ; Woodstock, 1.05 in.

15th, Paris, 1.15 in. ; Winona, 1.00 in.

16th, Pelee Island, 1.05 in. ; St. George, 1.05 in. ; Stony Mountain, 1.0 in.

17th, Little Forks, 2.00 in.

19th, Georgetown, P.E.I., 1.25 in.

20th, Port Hastings, 1.75 in.

21st, Quamichan, 2.90 in. ; Little Forks, 1.50 in.

22nd, Agassiz, 1.82 in. ; Maple Grove, 1.50 in.

26th, Bermuda, 1.42 in.

27th, Agassiz, 1.78 in.

29th, Pelee Island, 1.14 in. ; Bermuda, 1.10 in.

30th, Port Hastings, 1.35 in. ; Sable Island, 1.95 in. ; Sydney, 1.95 in.

Snowfall in the same districts as the rainfall :—

In B. COLUMBIA little or no snow has fallen.

In the N. W. TERRITORIES and MANITOBA about 1 inch has fallen at a few stations.

In ONTARIO. 0.1 in., or 1.0 in. below the average ; 1.7 in., or 0.7 in. below the average ; 0.2 in., or 1.5 in. below the average ; 0.8 in., or 3.0 in. below the average.

In QUEBEC it was 8.0 in., or 0.3 in. above the average.

In N. BRUNSWICK it was 0.1 in., or 1.5 in. above the average.

In N. SCOTIA it was 7.6 in., or about the usual quantity.

In P. E. ISLAND it was 4.5 in., or 0.1 in. below the average.

Monthly snowfall 8 in. and upwards :—

ONTARIO.—Sault Ste. Marie, 8 in.

QUEBEC.—W. P. of Anticosti, 9 in. ; Point des Monts, 17 in. ; Grindstone, 17 in.

NOVA SCOTIA.—Port Hastings, 28 in. ; Cow Bay, 17 in. ; Truro, 12 in. ; Sydney, 17 in.

NEW BRUNSWICK.—Point Escuminac, 10 in. ; Parker's Ridge, 15 in. ; Chatham, 9 in. ; Richmond, 8 in. ; Fredericton, 9 in.

Snowfall 5 in. and upwards in 24 hours.

3rd, Point Escuminac, 5 in. ; Parker's Ridge, 10 in. ; Point Lepreaux, 7 in. ; Truro, 6.7 in. ; Brome, 6 in. ; St. Andrews, 5.6 in.

4th, W. P. Anticosti, 7 in. ; Point des Monts, 14 in. ; Bathurst, 5 in. ; Dalhousie, 6 in. ; Richmond, 6 in. ; Fredericton, 6.0 in.

5th, Cow Bay, 6 in.

7th, Port Hastings, 24 in. ; Cow Bay, 9 in. ; Sydney, 8 in.

8th, White Head, 9 in. ; Grindstone, 8 in.

Thunder or lightning recorded on—

4th, Sable Island.

9th, Elora.

10th, Cottam, Pelee Island, Kingsville, Ridgetown, Lucknow, Sombra, Brantford, Wilton Grove, Thedford, Cowal, Point Clark, Petrolia, Guelph, Conestogo, London.

11th, Cotham, Wilton Grove, Coldstream, Blenheim, Sunshine.

12th, Coldstream.

14th, Cottam, Boyner, Lucknow, Sombra, Zurich, St. George, Wilton Grove, St. Thomas, Thedford, Georgetown, Ont., Cowal, Galt, Durham, Petrolia.

15th, Winona, Stoney Creek.

16th, Pelee Island.

17th, Cottam, Kingsville, Point Lepreaux.

18th, Elora, Sharon, Georgina, Peterborough, Midland, Georgetown, Ont., Presqu'Isle, Gravenhurst, Coldwater, Lindsay.

19th, Presqu'Isle, Scarborough, Warton.

22nd, Kingsville, Sombra, Georgetown, Ont., Cowal.

23rd, Pelee Island.

25th, Posen.

27th, Joly.

28th, Buda, Portage la Prairie, St. Albans, Brandon, Rapid City, Cartwright, Posen.

29th, Buda, Pelee Island, Gladstone.

30th, Buda, Pelee Island, Cotham, Point Clark, Durham, Brome.

Aurora recorded on—

The class of Aurora if noted by observer is given, I being brightest, IV the feeblest in brilliancy.

1st, Battleford, I ; Russell, IV ; Chicoutimi, Point Escuminac (bright) ; Dorchester, Cotham, II ; Pembina Crossing, II ; Rapid City, Woodstock, N.B., Banff, IV ; Posen, I ; Truro, III ; Bathurst, Grindstone, IV ; Father Point, III.

2nd, Cotham, II ; Pembina Crossing, II ; Banff, IV ; Posen, I ; Virden, IV ; Bathurst, Prince Albert, II ; Russell, IV ; Winnipeg, IV.

3rd, Buda, Savanne, Cotham, IV ; Virden, IV ; Minnedosa, II ; Prince Albert, III ; Battleford, I ; Winnipeg, III.

4th, Savanne, Cotham, IV ; Posen, I ; Virden, IV ; Prince Albert, IV ; Winnipeg, IV.

5th, Cotham, IV ; Alexandria, IV ; Prince Albert, III ; Russell, IV.

6th, Buda, Pembina Crossing, I ; Oak Bank, II ; Nova, IV ; Gravenhurst, II ; Winnipeg, IV.

7th, Point Escuminac, Fort Ellice, Savanne, Sharon, I ; Pelee Island, Clontarf, Joly, III ; Hali-burton, Axe Lake, Ridgetown, Portage la Prairie, I ; Cotham, I ; Zurich, II ; St. Albans, II ; Thedford, III ; Georgetown, Ont., III ; Peterborough, II ; Pembina Crossing, III ; Oak Bank, II ; Rapid City, Cartwright, I ; Nova, IV ; Posen, I ; Point Clark, I ; Gravenhurst, II ; Durham, III ; Fort Simpson, IV ; Coldwater, I ; Parry Sound, I ; Prince Albert, IV ; Winnipeg, I ; Toronto, III.

30th, Cotham, IV ; Father Point, IV ; Chicoutimi, IV.

STORM WARNINGS.

During the month warnings on the approach of two storms were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 55, of which 52, or 94·5 per cent., were verified. At three stations, however, the force exceeded that indicated by the signals displayed; four stations reported warnings received late, owing to delay in issue, and two stations reported a storm for which no warning was sent.

In connection with the warnings, predictions as to probable direction of the winds were given, and of the 52 warnings verified as to force 52, or 100·0 per cent., were fully verified.

No. 1. At 11 a. m. on the 27th cautionary signals for a moderate S. W., W. and N. W. gale were ordered from the Georgian Bay to Lake Ontario, inclusive, in advance of a depression then central over Lake Superior, which, as it passed over the districts warned during the day, caused a gale generally. Presqu'Isle reported S. W. 45 miles an hour, Saugeen N. E. 32 miles, Goderich S. W. 40 miles, Toronto W. 32 miles, Kingston S. W. 25 miles. Signals were lowered at 11.30 a.m. on the 28th.

No. 2. All Lake stations from Sault St. Marie to Kingston were warned for a moderate S. W., W. and N. W. gale at 10.10 p.m. on the 29th, in advance of another depression of some importance over Lake Superior. Like its predecessor, it was attended by strong winds and gales as it passed over the Lake region. Parry Sound reported N. W. 30 miles an hour, Goderich S. 35 miles, Pelee Island S. W. 27 miles. Trenton a moderate gale. Signals were lowered at 10.20 a. m. on 1st May.

PROBABILITIES.

The probabilities issued by this office at 11 p.m. each evening are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m.

The number of predictions issued during the month was 532. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			Percentage Fully.
		No. Fully.	No. Partly.	No. Not.	
LOWER LAKE REGION.....	116	82	21	13	70·7
UPPER ST. LAWRENCE.....	105	73	21	11	79·5
LOWER ST. LAWRENCE.....	103	74	18	11	80·6
GULF.....	105	79	16	10	82·9
MARITIME PROVINCES.....	103	71	22	10	79·6
TOTAL.....	532	379	98	55	80·5

The percentage of verification is obtained by taking the sum of those fully verified and half the sum of those partly verified and dividing by the whole number.

In ascertaining the percentage of verification of the predictions the reports from agents at the "Probability Stations," as well as the telegraphic reports, are used.

The daily probabilities and storm warnings were issued by Probability Officer H. V. Payne.

TORONTO OBSERVATORY MAGNETIC REVIEW FOR APRIL, 1891.

A slight disturbance prevailed during the first four days, the most important movement being an easterly swing of the declination magnet at 6.30 p. m. of the 2nd, the extreme taking place at 6.47 p. m. The magnet then slowly regained its normal reading. A little irregularity is shewn after 9 p. m. of the 5th; otherwise the magnets were quiet up to the 6th. On the 7th disturbing action commenced and assumed a more important character after 10 p. m. All morning the curves were undulatory, and a marked absence of rapid movements, still the magnets were decidedly disturbed. Slight disturbances continued until the afternoon of the 12th, when the movements increased and a well-marked storm was registered during the night of the 12th. The most important deflection was a westerly swing of 48' at 8 p. m., the extreme reading taking place at 8.10 p. m. A somewhat similar movement was recorded the previous evening about the same time, but of a much less extent. The vertical component of the force was increased during the afternoon of the 12th, and a sharp decrease set in a little before 8 p.m. There were no important changes in the horizontal component. The magnets continued slightly disturbed up to 10 a. m. of

the 15th, and for the following twenty-four hours a steady magnet prevailed. On the afternoon of the 16th another small disturbance sprung up and became more pronounced on the mornings of the 17th and 18th. A marked increase of the vertical component set in at 8 a. m. of the 17th and continued until 2 p. m., the h. f. showing a decrease from 6 a. m. to 10.50 a. m. The next morning this component was also changing.

From the afternoon of the 18th until 2 a. m. of the 20th the magnets were unusually steady. A disturbed period set in on the morning of the 20th and lasted until the morning of the 25th. The most important movements of the declination magnet took place between 8 and 10 p. m. of the 21st, slow waves of disturbance being then shown. From the 25th to the end of the month there were no changes of any importance, the magnets being generally steady, with the exception of a slight disturbance which was recorded on the night of the 28th and a few hours on the 29th.

On the 7th sudden display of aurora at 9.50, bright from 10 to 11.30 p. m. At midnight aurora still visible (class IV). On the 8th faint auroral light observed at midnight. On the 12th auroral arch and streamers, 8 to 8.30 p. m. (class III). On the 4th, 5th, 6th, 10th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 25th, 26th, 27th, 28th and 29th the sky was clear, but no aurora was observed. On all other nights clouds or haze would have hidden any aurora which might have existed.

It may be remarked that brilliant displays of aurora were generally observed throughout the Dominion on the 7th and 8th.

CHARLES CARPMAEL,

Director.

METEOROLOGICAL OFFICE,

TORONTO, June 8th, 1891.

METEOROLOGICAL SERVICE, DOMINION OF CANADA.

Monthly Weather Review.

MAY, 1891.

INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraphic reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief Signal Officer, Washington, D.C.

ATMOSPHERIC PRESSURE.

The average pressure, as determined from the observations taken at telegraph reporting stations, was above the normal of seventeen years, except in the neighbourhood of the Gulf of St. Lawrence.

May was remarkable for the great drought that prevailed over Ontario and the greater portion of Quebec, and also for the large number and comparative importance of the anti cyclonic systems.

During the first few days of the month comparatively high pressure covered Manitoba, the North-West Territories and British Columbia, and low pressure existed from the Lakes to the Atlantic. On the 2nd, from the Rockies to Manitoba, light falls of snow occurred in most localities, and on the early morning of the 3rd showers fell over Ontario, and later in the day in Quebec and the Maritime Provinces, otherwise the weather was generally fine. Temperature was, as a rule, below its average, more especially in the North-West, where minima of 10° were recorded.

By the morning of the 4th the high pressure which still covered the North West had developed into an anti-cyclonic system of some importance, which then passed slowly over the continent to the South Atlantic States. Its advance was marked between the 4th and 7th, in the Lake Region and along the St. Lawrence Valley, by some strong winds or moderate gales from the westward, with local showers of rain or snow and sharp frosts at night. In the Maritime Provinces also, it gave some local showers and frosts.

An area of low pressure which had apparently given copious rains in British Columbia on the 4th, immediately moved into the North West Territories as the anti-cyclone advanced. It gave a decided change to warm weather, maxima occurring from 82° at Calgary, to 94° at Winnipeg. Its showers and thunderstorms were also experienced in many localities, more generally on the 8th than at other times.

From the North-West the depression, between the 9th and 11th, passed over the Lake Region to the Atlantic, maxima of 76° to 80° , attended it in Ontario and Quebec together with some showers and thunderstorms. In the Maritime Provinces also, its showers were experienced in most localities.

The distribution of pressure, from the 11th until the 31st, was largely anti cyclonic from the Lakes to the Atlantic, no less than six high pressure areas made their influence felt during this period, and their movements were all from the north westward or northward. The low pressure areas were few and their energy was feeble. The rain which they brought was chiefly confined to the Maritime Provinces, and throughout the month Ontario and a large portion of Quebec suffered from severe drought. The interruptions to the long spell of fine weather were, in Ontario, a few showers, generally light, on the 15th, 21st and 25th, also a few showers on the 30th, confined to the south-west portion, and, in Quebec, heavy rains from Montreal east between the 16th and 18th, as well as some showers on the 21st and 26th. In the Maritime Provinces, as stated above, the rain was more frequent and general. On the 13th, heavy rain fell as far north as the Miramichi river and a depression passed south of Nova Scotia; between the 16th and 18th nearly two inches fell in many places as another depression moved up from the Atlantic, and on the 22nd, as well as began on the

30th, showers were very general. Temperature was about average or rather below ; the nights were as a rule particularly cool, especially in Ontario where frost was of frequent occurrence, noticeably on the nights of the 12th, 13th, 16th, 17th, 24th and 27th. The maximum temperature occurred between the 28th and 31st, over 80° being reported from most localities. A moderate gale was felt from the eastward on Lake Erie and the western half of Lake Ontario on the 22nd, but at other times the winds seldom reached the force of a strong breeze.

In the North-West Territories and Manitoba, after the 8th and until the end of the month, the distribution of pressure varied between cyclonic and anti-cyclonic. Contrary to the conditions in other portions of Canada, however, the cyclonic predominated, the winds also were frequently very strong, especially in Manitoba, on the 18th, 23rd, 25th, 27th and 29th. Rain fell at frequent intervals, more so between the 17th and 20th, again on the 23rd, and then from the 28th to the 31st inclusive ; the largest and most general amount fell between the 30th and 31st, when, in some localities, it was mingled with sleet. On the 28th, also, snow seems to have fallen generally in the Rocky Mountains slope. The temperature changes were at times large and varied, but on the whole the temperature was about normal or a little above. Sharp frosts occurred in most places on the 10th, 15th and 21st. Minnedosa reported 18° on the latter date. On the 29th, also, frost prevailed from Prince Albert to Edmonton. The maxima of the month ranging from 80° to 88° occurred on the 14th, 26th and 27th.

TEMPERATURE.

The average temperature as determined from observations taken at telegraph reporting stations, was below the normal of seventeen years except in the neighbourhood of the Gulf of St. Lawrence.

The highest and lowest temperatures in each Province during May were:—

British Columbia, $89^{\circ}0$ on 25th, at Quamichan ; $89^{\circ}0$ on 26th, at Maple Grove ; $23^{\circ}0$ on 2nd at Barkerville.

N. W. Territories, $93^{\circ}0$ on 27th, at Battleford ; $7^{\circ}0$ on 3rd, at Regina.

Manitoba, $99^{\circ}1$ on 7th, at Gladstone ; $0^{\circ}0$ on 3rd at Kola.

Ontario, $86^{\circ}0$ on 8th, at Nepigon ; $15^{\circ}0$ on 4th, at Savanne.

Quebec, $82^{\circ}6$ on 30th at Chicoutimi ; $24^{\circ}3$ on 11th, at Chicoutimi.

New Brunswick, $80^{\circ}5$ on 29th, at Chatham ; $25^{\circ}0$ on 12th, at Bathurst ; $25^{\circ}0$ on 6th, at Dorchester ; $25^{\circ}0$ on 6th, at Parker's Ridge.

Nova Scotia, $81^{\circ}0$ on 29th, at Pictou ; $26^{\circ}3$ on 24th, at Truro.

P. E. Island, $80^{\circ}2$ on 30th, at Kilmahumaig ; $27^{\circ}8$ on 6th, at Kilmahumaig.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, MAY, 1891.

STATION.	PRESSURE IN INCHES.				TEMPERATURE OF AIR.				DIRECTION OF WIND FROM.				VELOCITY OF WIND.				PRECIPITATION.																			
	Mean actual.	Highest.	Lowest.	Range.	Mean.	Diff. from average.	Years observed.	Highest.	Date.	Lowest.	Date.	Mean daily range.	Greatest daily range.	Mean temperature of dew-point.	Mean relative humidity.	Mean amount of cloud.	No. of days completely clouded.	N. E.		S. E.		S. W.		N. W.		Total number of hours.	Mean, miles per hour.	Highest days.	Date and direction.	Amount.	Diff. from average.	No. of fair days.	No. of Auroras.	No. of Thunderstorms.	No. of Fogs.	
																		N.	E.	S.	E.	S.	W.	N.	W.											
ASSINIBOIA:																																				
Medicine Hat.....	29.92	30.30	29.33	0.97	54.9	—	0.9	7.00-2	27	18.7	3	30.1	41.3	3	30.1	41.3	6	1	13	5	6	6	7	5	1	14	62	15.5	26 S.	1.13	—0.63	9.22	0	0	0	0
Edmonton.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Phoenix Forks.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Maple Creek.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Swift Current.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Qu'Appelle.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Kelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Regina.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Calgary.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40	29.46	0.94	50.6	—	0.2	8.86-0	26	17.0	1	27.6	43.0	1	27.6	43.0	4	2	2	4	5	1	2	0	16	50	62	10.2	19NW	0.90	—0.67	15.16	1	0	0	0
Gravelly.....	30.00	30.40																																		

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION, &c.—Continued.

	PRESSURE IN INCHES.				TEMPERATURE OF AIR.				MEAN TEMPERATURE OF				DIRECTION OF WIND FROM				VELOCITY OF WIND.				PRECIPITATION.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
	Mean actual.	Mean reduced.	Highest.	Lowest.	Range.	Mean.	Diff from aver- age.	Years observ- ed.	Date.	Lowest.	Date.	Highest.	Mean daily range.	Greatest daily range.	Mean relative humi- dity.	Mean amount of cloud No. of days completely clouded.	N.	N. E.	E.	S. E.	S.	W.	W. W.	N. W.	C.	Total number of hours.	Mean miles per hour.	Highest days velocity.	Date and direc- tion.	Amount. in.	Diff from aver- age.	No. of days.	No. of Auroras.	No. of Thunderstorms.	No. of Foggy.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
																																				ONTARIO—Continued.																																						Axe Lake.....	49.6	49.6	58.4	31	28.0	49.6	4	23.8	30.0	28.0	31	58.4	23.8	30.0	49.6	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.00	-2.26	0.31	0	0	0	0	Goldwater.....	50.5	50.5	58.0	31	23.2	50.5	23	27.7	44.2	23.2	31	58.0	27.7	44.2	50.5	0.5	5	5	1	6	8	10	2	25	35	93	0	93	0	0.49	-2.15	6.25	0	0	0	0	Beattie.....	49.5	49.5	58.0	31	28.0	49.5	5.17	25.3	36.1	28.0	31	58.0	25.3	36.1	49.5	0.1	19	0	7	3	12	1	17	17	93	0	93	0	0.44	-2.66	8.23	0	0	0	0	Gravenhurst.....	50.6	50.6	58.2	31	24.0	50.6	21	24.2	39.0	24.0	31	58.2	24.2	39.0	50.6	0.1	6	12	0	6	14	18	22	15	6	93	0	93	0	0.25	-2.74	6.25	1	0	0	0	North Bruce.....	49.3	49.3	57.0	30	21.0	49.3	4	23.8	37.0	21.0	30	57.0	23.8	37.0	49.3	0.5	3	3	2	6	3	0	1	3	13	37	62	0	62	0	0.55	-2.58	5.26	0	0	0	0	Rockville.....	48.4	48.4	53.0	30	21.0	48.4	23	32.8	57.0	21.0	30	53.0	32.8	57.0	48.4	0.5	3	3	2	6	3	0	1	3	13	37	62	0	62	0	0.40	-1.90	9.22	0	0	0	0	Zurich.....	52.5	52.5	58.0	21	29.0	52.5	7	23.3	38.0	29.0	21	58.0	23.3	38.0	52.5	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.92	-1.90	4.27	0	0	0	0	Point Clark.....	46.8	46.8	57.5	20	33.0	46.8	5	27.8	41.0	33.0	20	57.5	27.8	41.0	46.8	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.00	-2.53	6.31	0	0	0	0	St. Mary's.....	52.8	52.8	58.0	31	24.0	52.8	31	24.0	39.0	24.0	31	58.0	24.0	39.0	52.8	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.43	-1.80	3.28	0	0	0	0	Paris.....	52.5	52.5	58.0	31	24.0	52.5	31	24.0	39.0	24.0	31	58.0	24.0	39.0	52.5	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.58	-0.82	6.25	0	0	0	0	Lacknow.....	51.4	51.4	58.0	31	24.0	51.4	31	24.0	39.0	24.0	31	58.0	24.0	39.0	51.4	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.79	-2.02	6.25	0	0	0	0	Bognor.....	49.3	49.3	58.0	31	24.0	49.3	31	24.0	39.0	24.0	31	58.0	24.0	39.0	49.3	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.51	-2.40	7.24	0	0	0	0	Brimm.....	51.6	51.6	58.0	31	24.0	51.6	31	24.0	39.0	24.0	31	58.0	24.0	39.0	51.6	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.93	-1.08	7.24	0	0	0	0	Coffman.....	54.1	54.1	58.0	31	32.0	54.1	0.1	8.84	0	32.0	31	58.0	8.84	0	54.1	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.51	-1.80	8.23	0	0	0	0	Point Pelee.....	51.9	51.9	58.0	17	35.0	51.9	6.4	12.81	0	35.0	17	58.0	12.81	0	51.9	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.83	-2.80	2.29	0	0	0	0	Kingville.....	54.5	54.5	58.0	16	30.5	54.5	1.2	1.80	0	30.5	16	58.0	1.80	0	54.5	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.45	-3.31	10.21	0	0	0	0	Chatham.....	52.4	52.4	58.0	21	20.0	52.4	2.8	5.82	0	20.0	21	58.0	5.82	0	52.4	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	2.11	-0.81	12.19	0	0	0	0	Ridgeway.....	52.7	52.7	58.0	21	20.0	52.7	2.1	1.17	0	20.0	21	58.0	1.17	0	52.7	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.78	-0.94	10.21	0	0	0	0	Woodstock.....	50.6	50.6	58.0	31	28.1	50.6	31	28.1	39.0	28.1	31	58.0	28.1	39.0	50.6	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.39	-1.24	12.19	0	0	0	0	London.....	50.2	50.2	58.0	31	28.1	50.2	31	28.1	39.0	28.1	31	58.0	28.1	39.0	50.2	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.91	-0.73	13.16	0	0	0	0	Port Stanley.....	50.6	50.6	58.0	31	28.1	50.6	31	28.1	39.0	28.1	31	58.0	28.1	39.0	50.6	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.05	-1.23	4.27	0	0	0	0	Brantford.....	51.0	51.0	58.0	31	24.0	51.0	31	24.0	39.0	24.0	31	58.0	24.0	39.0	51.0	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.17	-1.24	12.19	0	0	0	0	St. George.....	51.3	51.3	58.0	29	26.0	51.3	3.2	17.71	7	26.0	29	58.0	17.71	7	51.3	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.68	-1.36	12.19	0	0	0	0	Port Dover.....	51.1	51.1	58.0	31	26.0	51.1	3.2	10.81	8	26.0	31	58.0	10.81	8	51.1	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.32	-1.93	2.29	0	0	0	0	Guelph.....	50.9	50.9	58.0	31	24.0	50.9	3.2	8.80	0	24.0	31	58.0	8.80	0	50.9	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.93	-1.34	6.25	0	0	0	0	Eldon.....	52.5	52.5	58.0	31	26.5	52.5	3.4	8.81	4	26.5	31	58.0	8.81	4	52.5	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.68	-0.36	8.23	0	0	0	0	Galt.....	52.1	52.1	58.0	31	24.0	52.1	3.9	6.82	0	24.0	31	58.0	6.82	0	52.1	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.50	-3.97	7.24	0	0	0	0	Niagara Falls, S.....	48.7	48.7	58.0	30	23.7	48.7	2.7	2.83	0	23.7	30	58.0	2.83	0	48.7	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.53	-2.03	8.23	0	0	0	0	Sault Ste. Marie.....	53.2	53.2	58.0	10	32.0	53.2	0.6	2.73	0	32.0	10	58.0	2.73	0	53.2	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	2.29	-0.79	13.16	0	0	0	0	DeCewville.....	52.8	52.8	58.0	21	21.8	52.8	0.7	3.83	8	21.8	21	58.0	3.83	8	52.8	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.00	-1.69	5.26	0	0	0	0	Sombra.....	51.3	51.3	58.0	29	24.0	51.3	1.9	10.82	4	24.0	29	58.0	10.82	4	51.3	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.73	-2.01	9.22	0	0	0	0	Mattawa.....	55.0	55.0	58.0	31	32.0	55.0	2.8	7.81	0	32.0	31	58.0	7.81	0	55.0	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	2.40	-0.29	7.24	1	0	0	0	Conestoga.....	53.8	53.8	58.0	31	31.0	53.8	3.0	3.85	9	31.0	31	58.0	3.85	9	53.8	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.44	-2.29	7.24	0	0	0	0	Stoney Creek.....	52.2	52.2	58.0	31	31.0	52.2	3.0	3.85	9	31.0	31	58.0	3.85	9	52.2	0.3	0	21	22	4	5	21	7	6
ONTARIO—Continued.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
Axe Lake.....	49.6	49.6	58.4	31	28.0	49.6	4	23.8	30.0	28.0	31	58.4	23.8	30.0	49.6	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.00	-2.26	0.31	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Goldwater.....	50.5	50.5	58.0	31	23.2	50.5	23	27.7	44.2	23.2	31	58.0	27.7	44.2	50.5	0.5	5	5	1	6	8	10	2	25	35	93	0	93	0	0.49	-2.15	6.25	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Beattie.....	49.5	49.5	58.0	31	28.0	49.5	5.17	25.3	36.1	28.0	31	58.0	25.3	36.1	49.5	0.1	19	0	7	3	12	1	17	17	93	0	93	0	0.44	-2.66	8.23	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Gravenhurst.....	50.6	50.6	58.2	31	24.0	50.6	21	24.2	39.0	24.0	31	58.2	24.2	39.0	50.6	0.1	6	12	0	6	14	18	22	15	6	93	0	93	0	0.25	-2.74	6.25	1	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
North Bruce.....	49.3	49.3	57.0	30	21.0	49.3	4	23.8	37.0	21.0	30	57.0	23.8	37.0	49.3	0.5	3	3	2	6	3	0	1	3	13	37	62	0	62	0	0.55	-2.58	5.26	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Rockville.....	48.4	48.4	53.0	30	21.0	48.4	23	32.8	57.0	21.0	30	53.0	32.8	57.0	48.4	0.5	3	3	2	6	3	0	1	3	13	37	62	0	62	0	0.40	-1.90	9.22	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Zurich.....	52.5	52.5	58.0	21	29.0	52.5	7	23.3	38.0	29.0	21	58.0	23.3	38.0	52.5	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.92	-1.90	4.27	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Point Clark.....	46.8	46.8	57.5	20	33.0	46.8	5	27.8	41.0	33.0	20	57.5	27.8	41.0	46.8	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.00	-2.53	6.31	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
St. Mary's.....	52.8	52.8	58.0	31	24.0	52.8	31	24.0	39.0	24.0	31	58.0	24.0	39.0	52.8	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.43	-1.80	3.28	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Paris.....	52.5	52.5	58.0	31	24.0	52.5	31	24.0	39.0	24.0	31	58.0	24.0	39.0	52.5	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.58	-0.82	6.25	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Lacknow.....	51.4	51.4	58.0	31	24.0	51.4	31	24.0	39.0	24.0	31	58.0	24.0	39.0	51.4	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.79	-2.02	6.25	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Bognor.....	49.3	49.3	58.0	31	24.0	49.3	31	24.0	39.0	24.0	31	58.0	24.0	39.0	49.3	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.51	-2.40	7.24	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Brimm.....	51.6	51.6	58.0	31	24.0	51.6	31	24.0	39.0	24.0	31	58.0	24.0	39.0	51.6	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.93	-1.08	7.24	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Coffman.....	54.1	54.1	58.0	31	32.0	54.1	0.1	8.84	0	32.0	31	58.0	8.84	0	54.1	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.51	-1.80	8.23	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Point Pelee.....	51.9	51.9	58.0	17	35.0	51.9	6.4	12.81	0	35.0	17	58.0	12.81	0	51.9	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.83	-2.80	2.29	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Kingville.....	54.5	54.5	58.0	16	30.5	54.5	1.2	1.80	0	30.5	16	58.0	1.80	0	54.5	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.45	-3.31	10.21	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Chatham.....	52.4	52.4	58.0	21	20.0	52.4	2.8	5.82	0	20.0	21	58.0	5.82	0	52.4	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	2.11	-0.81	12.19	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Ridgeway.....	52.7	52.7	58.0	21	20.0	52.7	2.1	1.17	0	20.0	21	58.0	1.17	0	52.7	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.78	-0.94	10.21	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Woodstock.....	50.6	50.6	58.0	31	28.1	50.6	31	28.1	39.0	28.1	31	58.0	28.1	39.0	50.6	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.39	-1.24	12.19	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
London.....	50.2	50.2	58.0	31	28.1	50.2	31	28.1	39.0	28.1	31	58.0	28.1	39.0	50.2	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.91	-0.73	13.16	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Port Stanley.....	50.6	50.6	58.0	31	28.1	50.6	31	28.1	39.0	28.1	31	58.0	28.1	39.0	50.6	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.05	-1.23	4.27	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Brantford.....	51.0	51.0	58.0	31	24.0	51.0	31	24.0	39.0	24.0	31	58.0	24.0	39.0	51.0	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.17	-1.24	12.19	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
St. George.....	51.3	51.3	58.0	29	26.0	51.3	3.2	17.71	7	26.0	29	58.0	17.71	7	51.3	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.68	-1.36	12.19	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Port Dover.....	51.1	51.1	58.0	31	26.0	51.1	3.2	10.81	8	26.0	31	58.0	10.81	8	51.1	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.32	-1.93	2.29	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Guelph.....	50.9	50.9	58.0	31	24.0	50.9	3.2	8.80	0	24.0	31	58.0	8.80	0	50.9	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.93	-1.34	6.25	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Eldon.....	52.5	52.5	58.0	31	26.5	52.5	3.4	8.81	4	26.5	31	58.0	8.81	4	52.5	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.68	-0.36	8.23	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Galt.....	52.1	52.1	58.0	31	24.0	52.1	3.9	6.82	0	24.0	31	58.0	6.82	0	52.1	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.50	-3.97	7.24	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Niagara Falls, S.....	48.7	48.7	58.0	30	23.7	48.7	2.7	2.83	0	23.7	30	58.0	2.83	0	48.7	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.53	-2.03	8.23	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Sault Ste. Marie.....	53.2	53.2	58.0	10	32.0	53.2	0.6	2.73	0	32.0	10	58.0	2.73	0	53.2	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	2.29	-0.79	13.16	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
DeCewville.....	52.8	52.8	58.0	21	21.8	52.8	0.7	3.83	8	21.8	21	58.0	3.83	8	52.8	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	1.00	-1.69	5.26	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Sombra.....	51.3	51.3	58.0	29	24.0	51.3	1.9	10.82	4	24.0	29	58.0	10.82	4	51.3	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.73	-2.01	9.22	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Mattawa.....	55.0	55.0	58.0	31	32.0	55.0	2.8	7.81	0	32.0	31	58.0	7.81	0	55.0	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	2.40	-0.29	7.24	1	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Conestoga.....	53.8	53.8	58.0	31	31.0	53.8	3.0	3.85	9	31.0	31	58.0	3.85	9	53.8	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.44	-2.29	7.24	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Stoney Creek.....	52.2	52.2	58.0	31	31.0	52.2	3.0	3.85	9	31.0	31	58.0	3.85	9	52.2	0.3	0	21	22	4	5	21	7	6	7	0	93	0	93	0	0.49	-1.36	8.23	1	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Georgetown.....	50.6	50.6	58.0	30	29.0	50.6	3.6	5.17	8	29.0	30	58.0	5.17	8	50.6	0.3	0	21	22	4	5	21																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													

ONTARIO—*Continued*

Norfolk	48.5	—	4.5	484.9	31	21.9	23	30.0	46.3	6	7	11	1	6	1	6	16	7	16	33	91	11	11.7	28.2	4 NW	0.28	—	2.64	5.26	2	0	0
Cook's Mills	.....	48.3	.....	.....	.....	8	27.8	4	21.1	38.1	.....	5	6	2	0	2	7	1	6	31	.....	.....	.....	.....	.....	.....	1.46	0.19	.....	4.27	1	0	0
Waukegan	.....	51.8	—	4.0	483.0	31	23.8	7	25.8	41.5	.....	4	2	7	10	3	11	0	28	0	34	0	93	1	10 N	2.65	0.65	—	0.46	4.27	0	0	0
Shannonville	.....	54.2	—	1.0	2.81.0	31	30.0	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.75	—	1.86	5.26	0	1	0	

Quebec

Montreal	29.48.30	31.29.01	0.70	52.4	—	2.0	17.80.0	10	31.7	5	20.8	33.5	40.5	62	5	2	84	14	21	65	103	252	114	55	1	744	11.7	28.2	4 NW	1.71	—	1.22	12.19	0	0	2
Huntingdon	.....	29.56	29.96	29.36	50.2	—	3.1	21.80.0	10	26.0	19	25.5	43.0	.....	.....	5	2	6	25	5	8	0	40	5	12	0	93	11	14.6	—	2.54	9.22	0	0	0
Richmond	.....	3.0	11	80.9	50.9	—	3.0	11.80.0	20	25.0	6	20.6	46.8	.....	.....	5	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.13	—	0.40	11.20	0	1	0	
Chesterhill	.....	46.3	—	1.8	13.82.6	20	21.3	11	24.3	43.2	.....	.....	.....	.....	.....	5	2	0	25	0	1	1	0	56	0	84	11	1.61	—	0.70	8.23	5	0	1	
Quebec	.....	49.2	—	0.3	17.79.7	20	27.0	5	23.4	36.8	.....	.....	.....	.....	.....	5	2	4	7	4	2	5	10	18	3	7	62	19	2.05	—	0.43	14.17	0	0	0
St. Hyacinthe	.....	29.55	30.28	29.46	0.75	53.0	.....	.....	10-29	26.0	6	24.6	36.0	.....	.....	4	5	8	0	0	3	1	16	2	3	33	11	2.52	—	0.08	12.19	0	1	0	
Brome	.....	31.1	—	2.9	11.78.0	10	25.0	19	22.1	41.0	.....	.....	.....	.....	.....	4	3	24	1	4	4	20	9	29	2	0	93	11	3.29	—	0.71	14.17	0	0	0
Father Point	.....	29.52	30.58	29.56	0.52	43.7	—	0.2	16.59.7	15	28.8	9	16.7	29.5	.....	.....	1	8	2	2	2	3	2	3	6	5	61	26.0	2.40	—	0.60	11.20	2	0	1
Point des Monts	.....	43.4	—	0.9	8.60.0	15	30.0	1	.....	.....	.....	.....	.....	.....	.....	2	35	0	0	0	25	17	1	13	93	2.40	—	1.20	6.25	0	0	0	0	7	
Cape Chatte	.....	43.7	—	1.0	8.55.0	28	34.0	5	.....	.....	.....	.....	.....	.....	.....	4	4	12	1	1	1	11	29	3	28	93	0.79	—	0.75	3.28	0	0	7		
Bicquet	.....	43.0	.....	.....	.....	31	34.0	7	.....	.....	.....	.....	.....	.....	.....	3	35	2	0	0	26	5	8	14	93	1.50	—	0.96	4.27	0	0	5	4		
Cape Magdalen	.....	43.2	—	0.4	8.60.0	17	34.0	6	.....	.....	.....	.....	.....	.....	.....	2	2	6	4	25	5	1	43	5	93	3.14	—	1.60	9.22	0	0	4	2		
Anticosti	W.P.	40.6	—	0.6	7.56.0	29	31.0	4	.....	.....	.....	.....	.....	.....	.....	6	8	11	8	22	2	10	26	0	93	2.15	—	0.40	10.21	0	0	2	0		

New Brunswick

Fredericton	.....	20.95	30.50	29.50	0.50	51.1	0	18.77.7	26	20.0	6	24.7	36.0	10.6	66	6	9	18	7	1	12	3	12	21	11	8	93	7.3	14.9	4 W	2.20	—	1.86	22	9	0	0	
Chatham	.....	20.95	30.43	29.53	0.95	41.5	2.5	17.80.5	29	25.2	8	23.5	41.4	.....	.....	5	4	1	4	1	6	8	13	7	4	18	62	.....	13.5	5.8 W	2.20	—	1.45	14.17	0	0	0
Bathurst	21.5	30.43	29.51	1.03	41.5	2.5	17.80.0	30	25.0	12	25.5	36.0	5	4	1	5	0	1	22	0	3	14	4	11	34	89	1	10	16 W	1.40	—	1.20	5.26	0	0	0
St. Andrews	.....	20.95	30.43	29.64	0.74	47.8	—	0.17.71.6	28	31.5	5	21.0	34.7	.....	.....	3	4	3	9	1	6	8	5	1	10	19	62	1	2.04	—	1.53	14.17	0	0	2		
Grand Manan	.....	20.94	30.49	29.61	0.74	47.8	—	0.0	7.68.6	29	30.5	6	17.1	27.6	.....	.....	5	5	3	9	3	6	16	8	5	17	62	.....	19.0	28.8 W	1.91	—	1.40	11.20	0	0	3
Point Lepreau	.....	.....	.....	.....	.....	44.8	—	0.1	12.53.0	25	30.5	5	.....	.....	.....	.....	5	5	9	3	6	9	19	13	11	8	78	11	11	4 W	2.40	—	1.60	14.17	0	0	0
St. John	.....	20.95	30.52	29.57	0.95	48.1	—	0.2	7.67.0	29	33.0	5	15.5	28.0	39.5	72	6	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. John City	.....	20.95	30.51	29.58	0.96	47.0	—	0.2	31.63.0	2	36.0	5	12.0	.....	.....	84	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.3	14.9	.....	2.61	—	1.72	8.23	0	0	4
Dochester	.....	.....	.....	.....	.....	44.5	—	1.5	3.67.0	31	25.0	6	17.8	28.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bathurst	43.6	—	0.8	12.17.0	29	27.0	6	22.0	37.5	4	5	0	0	6	1	0	0	16	1	38	62	1	15	15 E	0.97	—	2.36	5.26	0	0	0	
Parsons River	.....	.....	.....	.....	.....	43.0	—	0.1	4.77.0	29	25.0	6	22.0	38.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Woodville	44.5	—	0.5	4.77.0	29	28.5	15	21.2	42.5	6	6	12	3	3	2	12	5	9	6	0	51	5.1	9.1	23 W	2.65	—	1.57	9.22	0	0	0	

New Scotia

Halifax	45.8	—	0.5	18.73.2	30	23.8	6	20.6	32.3	41.1	73	5	4	4	5	1	7	10	14	8	10	3	62	5.6	9.4	5 W	4.18	—	0.55	17.14	
.....	45.1	—	0.4	21.73.0	22	20.7	7	20.1	39.4	37.3	74	6	4	4	12	13	4	15	38	46	27	19	12	186	9.5	20.6	17 NE	4.06	—	0.06	14.17	0	0	0
.....	.....	43.2	—	0.5	11.73.0	29	29.9	3	16.5	31.7	.....	.....	5	5	1	6	1	6	9	11	14	9	2	62	17.9	17 N	2.31	—	1.38	13.18	0	0	8
.....	.....	49.1	—	0.7	18.80.2	29	26.3	24	23.2	41.7	.....	.....	1	1	8	11	0	4	11	21	22	7	9	93	11	18 W	4.68	—	1.51	16.15	0	0	0
.....	.....	50.1	—	2.8	12.81.0	29	30.8	7	18.8	33.0	.....	.....	3	3	17	8	17	6	10	28	4	7	2	93	11	13 NE	4.32	—	1.00	6.25	0	0	2
.....	.....	49.0	—	0.9	11.70.0	28	35.0	6	.....	.....	.....	.....	4	3	6	14	0	0	0	12	7	36	0	75	.....	.....	1.70	—	0.10	3.28	0	0	0
.....	.....	41.2	—	1.5	7.55.0	27	34.5	10	.....	.....	.....	.....	.....	.....	14	1	3	4	7	44	5	3	12	93	.....	.....	2.87	—	0.40	10.21	0	0	10
.....	.....	43.4	—	1.0	7.60.0	30	33.0	3	.....	.....	.....	.....	.....	.....	1	7	2	9	10	18	24	8	11	93	.....	.....	1.84	—	0.50	10.21	0	0	15

New South Wales

St. John's	.....	41.8	—	1.5	.....	30	30.0	11	17.7	31.0	.....	.....	7	9	0	16	4	9	11	11	6	5	0	62	.....	28.3	24 NE	5.85	—	2.01	16.15	0	0	5
.....	.....	40.2	—	.....	.....	29	37.8	9	9.5	15.0	.....	.....	5	2	3	11	5	13	8	12	0	7	0	62	.....	12.5	6 NW	7.63	—	.....	8.23	0	0	0

New York

Albany	.....	43.6	—	1.1	12.80.2	30	27.8	6	23.3	31.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	48.7	—	1.8	7.70.5	29	31.0	6	19.2	37.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	47.5	—	1.0	15.70.6	29	31.6	1	15.7	25.8	.....	.....	4	6	163	25	3	15	156	210	21	111	60	741	.....	18.2	5.8 W	2.45	—	0.70	13.18	0	0	0

New Zealand

Wellington	41.2	—	1.5	24	26	8	16.7	27.1	48.0	85	1	1	9	2	1	12	40	45	14	6	54	186	7	76	11.7	28
.....	.....	40.8	—	0.8	4.80.0	25	30.5	2	26.4	51.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	41.5	—	1.1	3.47.0	25	35.0	3	23.7	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	40.4	—	1.1	3.47.0	25	32.0	5	22.7	31.0	36.8	65	5	4	1	0	3	0	1	12	7	4	31	2.4	5.2	23 W	2.46	—	1.50	8.23	0	0	1	0
.....	.....	35.0	—	1.8	2.80.0	26	32.0	7	26.0	41.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	40.7	—	0.7	8.57.7	24	26	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

STATIONS TOO LATE FOR APRIL REVIEW.

PROVINCE.	STATION.	MEAN TEMP.	HIGHEST TEMPERATURE.		LOWEST TEMPERATURE.		PRECIPITATION.		AURORAS.	THUNDER STORMS.
			Temp.	Date.	Temp.	Date.	Amount.	Days.		
		°	°		°		in.			
N. W. Territories	Regina	43.53	85.0	23	1.0	3	0.85	6		28th, 29th.
Manitoba	Channel Island	28.83	62.5	21	-13.0	3	0.15	4	1, 2, 7, 8, 13, 17.	
Ontario	Alton	40.19	75.0	28	13.5	5	1.60	8	8.	14th, 18th, 30th.

At Channel Island, 6th, Wild Geese; 8th, Crows; 9th, Gulls; 19th, Wild Ducks; 20th, Robins, Gold-winged Woodpeckers, Blackbirds and Warblers; 20th, first rain; 28th, ice breaking up in Lake Winnipeg.

In Alton, 2nd, Wild Geese; 6th, Grey birds; 14th, Frogs heard; 26th, Whip-poor-Will heard; 29th, ground frozen.

PRECIPITATION.

The rainfall throughout the Dominion has fallen very far below the average, affording a marked contrast to that of May, 1890, the average of which is given for comparison. At some stations in Ontario during the past month no rain has fallen.

The distribution is as follows:—

In BRITISH COLUMBIA, 1.60 in., about the average (1890, 1.74 in.).

In MANITOBA and N. W. TERRITORIES it was 0.73 in., or 1.72 in. below the average (1890, 1.75 in.).

In ONTARIO, South and Southwest District, it was 1.48 in., or 0.74 in. below the average (1890, 4.30 in.). In the North and Northwest District it was 0.66 in., or 1.89 in. below the average (1890, 2.88 in.). In the Central District it was 0.62 in., or 1.26 in. below the average (1890, 3.05 in.), and in the East and Northeast District it was 1.53 in., or 1.78 in. below the average (1890, 2.72 in.).

In QUEBEC it was 2.08 in., or 0.60 in. below the average (1890, 3.62 in.).

In NEW BRUNSWICK it was 2.23 in., or 1.06 in. below the average (1890, 6.27 in.).

In NOVA SCOTIA it was 3.03 in., or 0.34 in. below the average (1890, 3.30 in.).

In P. E. ISLAND it was 2.26 in., or 0.75 in. below the average (1890, 3.71 in.).

Rainfall 5 in. and upwards during month:

St. John, N. F., 5.55 in.; Bermuda, 7.63 in.

Rainfall 1 in. and upwards in 24 hours.

3rd, Agassiz, 1.58 in.; Ignace, 1.08 in.

4th, Port Moody, 1.23 in.

13th, Pictou, 2.05 in.; Georgetown, P.E.I., 1.46 in.; Port Hastings, 1.85 in.; Cow Bay, 1.10 in.;

Halifax, 1.50 in.; Truro, 1.04 in.

14th, Sydney, 1.31 in.

16th, Richmond, 1.07 in.; Father Point, 1.37 in.; Quebec, 1.14 in.

17th, Dorchester, 1.07 in.; Cow Bay, 1.10 in.; Digby, 1.00 in.; Halifax, 1.40 in.; St. John, 1.04 in.;

Truro, 1.34 in.

20th, Savanne, 1.15 in.; Ignace, 1.20 in.

21st, Watford, 1.10 in.; Wyoming, 1.50 in.

22nd, Birnam, 1.02 in.; Wanstead, 1.30 in.; Stoney Creek, 1.03 in.

24th, Bermuda, 1.00 in.

31st, Savanne, 1.15 in.; Ignace, 1.60 in.; Bermuda, 2.05 in.; Morris, 1.70 in.; Carman, 1.44 in.; Regina, 1.31 in.

SNOWFALL. Snow fell pretty generally in the early part of month, and as late as the 30th and 31st in the N. W. Territories, the general distribution and amount when measurable was as follows:

1st, Maple Creek, 3 in.; Channel Island, 0.5 in.; St. Albans, Barclay, Calgary 2nd, Pembina Crossing, Treherne, 1.5 in.; Kola, Bradwardine, Swift Current, 1.4 in.; Maple Creek, 1 in.; Fort Ellice, 1 in.; Channel Island, 0.3 in.; St. Albans, Brandon, 1 in.; Posen, 0.4 in.; Portage la Prairie, 2 in.; Evandale, 2 in.; Rapid City, 0.5 in.; Battleford, 0.8; Minnedosa, 1 in.; Qu'Appelle, 0.2 in.; Calgary.

- 3rd, Georgina, Sunnyside, 1 in. ; Savanne, Gravenhurst, Bancroft, 0.3 in. ; Glen Adelaide 2.5 in. ; Midland, Orillia, 0.5 in. ; Barclay, 1 in. ; Heron Bay, 2 in. ; Cook's Mills, Norquay, 2.5 in. ; Hartney, 2 in. ; Turtle Mountain, 0.8 in. ; Selkirk, Pilot Mound, Gretna, 0.5 in. ; Craiglea, 3 in. ; Minnedosa, 0.5 in.
- 4th, Georgina, Birnam, Novar, 1 in. ; Wanstead, Gravenhurst, Cartier, 1 in. ; Joly, 1.3 in. ; Barkerville, Parker's Ridge, Beatrice, 0.5 in. ; Eau Claire, 0.8 in. ; Cowal, Peterboro', Chicoutimi, Dalhousie, 2 in. ; Lindsay, London, Conestogo, Guelph, Durham, Thedford, Georgetown, Orillia, 0.5 in. ; Wiarton, Mid-Lothian, Sharon, Uplands, Parry Sound, 0.3 in.
- 5th, Paris, Bognor, Ridgetown, Birnam, Shannonville, Collingwood, Novar, 0.2 in. ; Stony Creek, Cartier, Joly, 0.9 in. ; Bancroft, 0.7 in. ; St. Hyacinthe, Egremont, 1.0 in. ; Elora, 0.6 in. ; Galt, Parker's Ridge, Beatrice, 1.0 in. ; Point Escumiac, Sunshine, Ottawa, Petrolia, Lindsay, 0.3 in. ; London, Ottawa, Conestogo, 0.6 in. ; Guelph, 0.1 in. ; Aurora, Presqu'Isle, Cowal, Denbigh, Sprucedale, Thedford, Georgetown, Huntingdon, Deseronto, Durham, Parry Sound, 0.7 in. ; Kingston, 0.2 in. ; Saugeen, 0.7 in. ; Orillia, Mid Lothian, Thedford, Sharon, Cottam, Uplands, Sault Ste. Marie.
- 6th, Paris, Collingwood, Norwood, Joly, 1 in. ; St. Hyacinthe, 1.0 in. ; Egremont, 0.4 in. ; Galt, Thedford, Sharon, Lindsay, Huntingdon, Deseronto, 0.6 in. ; Durham.
- 7th, Digby, Truro, Kingston, 0.2 in.
- 9th, Glen Adelaide, 0.5 in. ; Barclay, 2 in. ; Pembina Crossing.
- 10th, Savanne.
- 14th, Chicoutimi, Petrolia.
- 15th, Savanne, Norquay.
- 16th, Collingwood, Presqu'Isle, Durham.
- 17th, Joly, Uplands
- 18th, Barkerville, Parker's Ridge.
- 20th, Calgary.
- 24th, Savanne.
- 26th, Uplands.
- 28th, Edmonton.
- 30th, Chaplin, 0.5 in. ; Maple Creek, 4 in. ; Swift Current, 2.6 in.
- 31st, Swift Current, 2.6 in.

The record of frost during the month is extensive, and when frost is not noted, the readings of the thermometer when 32° or below is given.

- 1st, Birnam, Gravenhurst, Eau Claire, Brandon, (ice) ; St. Thomas, Cartwright, Turtle Mountain, (25°).
- 2nd, Sunnyside, (*Rhubarb and Maple leaves nipped by frost*) ; Picton, Gravenhurst, Sombra, Scarboro, St. Thomas, Uplands, (25°) ; Posen, (18°) ; Shoal Lake, Evandale, Cartwright, Turtle Mountain, Treherne, (20°).
- 3rd, Picton, Dorchester, Sombra, Sault St. Marie, Posen, (18°) ; Portage la Prairie, (6°) ; Rapid City, (*ice 1½ in.*) ; Norquay, (12°) ; Turtle Mountain, (10°) ; Kola, (6°).
- 4th, Shoal Lake, (*wheat cut down*) ; Norquay, (16°) ; Turtle Mountain, (16°) ; Treherne, (17°) ; Chaplin, Renfrew, (28°) ; Georgina, Peterboro' (20°) ; Sombra, Gladstone, (*ground fro. 1 in.*) ; Brome, Brandon, Wiarton, Uplands, (25°) ; Posen, (17°) ; Portage la Prairie, (16°) ; Rapid City, (*ice 1 in.*) ; Pilot Mound, (*wheat fro. close to ground*) ; Morden, (*fro. all that was up*)
- 5th, Paris, (½ in. ice) ; Bognor, North Bruce, Renfrew, (28°) ; Birnam, (*ice 1 in.*) ; Buda, (17°) ; Peterboro', (20°) ; Niagara Falls, S., (24°) ; Stony Creek, Sombra, (*ice ¼ in.*) ; Scarboro, (*ice 1½ in.*) ; Wiarton, St. Thomas, (*ice*) ; Cottam, Uplands, (24°) ; Posen, (20°) ; Rapid City, (*wheat cut down*) ; Cartwright, Selkirk, (17°) ; Guelph, (*heavy*) ; Toronto.
- 6th, Owen Sound, (24°) ; Renfrew, (30°) ; Georgina, Shannonville, (30°) ; Pelee Island, Sombra, (*ice*) ; Cowal, (*ice*) ; Nelson, (*ice*) ; St. Thomas, (10°), (*ice ½ in.*) ; Digby.
- 7th, Ridgetown, (23°) ; Renfrew, (30°) ; Birnam, (*ice*) ; Wanstead, (24°) ; Zurich, Sombra, (*ice*) ; Wiarton, Cottam, Sault St. Marie, (25°) ; Woodstock, (22°) ; Petrolia, (24°).
- 8th, Sombra, St. Thomas.
- 10th, Clandeboye, Bradwardine, Battleford, (20°).
- 11th, Georgina, Eau Claire, Cowal, Wiarton, Turtle Mountain

- 12th, Renfrew, (30°); Georgina, Birnam, Whiteside, (25°); Gravenhurst, De Cewsville, Clontarf, Sombra, Brome, Eau Claire, Scarboro, St. Thomas, Sault St. Marie (26°).
- 13th, Kingsville, Birnam, Whiteside, (26°); Collingwood, Pictou, Gravenhurst, De Cewsville, Treherne, (25°); Winnipeg, (23°); Clontarf, Sombra, Eau Claire, Georgetown, Wiarton, St. Thomas, Uplands, (25°); Cartwright.
- 14th, Georgina, Pictou, Eau Claire, Cowal.
- 15th, Toronto, (*ice*); Renfrew, (30°); Birnam, Peterboro', (32°); Pictou, Novar, (28°); Dorchester, Sombra, Brome.
- 16th, Port Arthur, (25°); Ridgetown, (28); Shannonville, Buda, (30°); Savanne, (18°); Novar, (29°); Cartier, (27°); Biscotasing, (25°); Eau Claire, (*heavy*); Sarnia, (*fruit damaged*); Mid Lothian, (*ice*); Clandeboye, Petrolia, (27°).
- 17th, Paris, (*ice 1 $\frac{1}{2}$ -in.*), *garden stuff destroyed*; Lucknow, (*half the grapes destroyed*); Ridgetown, (20°); Cottam, Kingsville, (32°); Renfrew, (27°); Birnam, (*ice 1 $\frac{1}{4}$ -in., great damage to vegetables and fruit*); Whiteside, (30°); Petrolia, (23°); Lindsay, (26°); Durham, (24°); Toronto, Shannonville, Novar, (25°); Wanstead, (28°); De Cewsville, Joly, (22°); Clontarf, Zurich, Sombra, (*ice*); Bancroft, (28°); Egremont, (27°); Beatrice, (28°); Eau Claire, Scarboro', (*ice*); Wilton Grove, (*severe*); St. Thomas, (*ice 1 $\frac{1}{2}$ -in.*); Uplands, (23°); Sault St. Marie, (26°); Deseronto, (28°).
- 18th, Peterboro, (31°); Sombra.
- 19th, Renfrew, (23°), (*leaves touched*); Bancroft, (27°); Richmond, St. Hyacinthe, Wiarton, Huntingdon, (26°); Alexandria, (27°); Rockliffe, (24°)
- 20th, Pictou, Evandale.
- 21st, Hillview, (*ice*); Russell, (12°); Fort Ellice, (*wheat and vegetables frozen*); Posen, (*ice 1 $\frac{1}{4}$ -in.*); Portage la Prairie, (24°); Rapid City, Treherne, (26°); Clandeboye, Pilot Mound, Winnipeg, (25°).
- 22nd, Georgina, (*heavy*); Collingwood, (*heavy*); Savanne, (21°); Denbigh, (*severe*).
- 23rd, Beatrice, (29°); Eau Claire, (*ice 1 $\frac{1}{4}$ -in.*); Wiarton, (*ice*); Nelson, Uplands, (22°); Coldwater, (23°); Renfrew, (25°); Georgina, (*heavy*); Whiteside, (31); Collingwood, Peterboro', (29°); Novar, (22°); Gravenhurst, Pelee Island, Joly, (25°); Haliburton, (28°); Bancroft, (26°); Brome, Richmond, Coldwater, (23°); Rockliffe, 24°; Toronto.
- 24th, Ridgetown, (24°); Mattawa, (24°) Whiteside, (30°); Shannonville, Buda, (32°); Peterboro', (30°); Pictou, Novar, (27°); Gravenhurst, Russell, (24°); Stoney Creek, Clontarf, Zurich, Sombra, (*ice*); Selkirk, (30°); Hanlan, Woodstock, (29°); Winnipeg, (27°); Coldwater, (27°); Guelph, (28°); Brome, Richmond, Egremont, (28°); Galt, (29°); Cowal, Scarboro', (*ice*); Georgetown, (*ice*); Wiarton, (*ice*); Nelson, St. Thomas, (*ice*); Uplands, (22°); Cartwright, Pembina Crossing, Conestogo, (*severe*); Lindsay, (30°); Toronto, (26°); London, (31°); Guelph, (28°); Coldwater, (27°); Parry Sound, (28°).
- 25th, Sunnyside, (23°); Savanne, (20°); Eau Claire, Georgetown, Cartwright, Pembina Crossing, (25°); Clandeboye, Stony Mountain, (28°); Port Arthur, (26°).
- 26th, Hillview, Georgina, (*heavy*); Collingwood, Sunnyside, (30°); Savanne, (18°); Haliburton, (27°); Sarnia, (*apples all gone*); Pembina Crossing, (30°); Kola, (*ice*); Clandeboye, Hanlan, Winnipeg, (28°).
- 27th, Lucknow, (29 $\frac{1}{2}$ °); Ridgetown, (27°); Mattawa, (25°); Owen Sound, (30°); Renfrew, (25°); Birnam, (*ice 1 $\frac{1}{8}$ in.*); Whiteside, (27°); Peterboro', (30°); Novar, (22°); Wanstead, (30°); Gravenhurst, Joly, (27°); Clontarf, Axe Lake, (28°); Zurich, Sombra, (*ice 1 $\frac{1}{4}$ -in.*); Bancroft, (24°); Brome, Egremont, (27°); Galt, (30°); Point Clark, Beatrice, (29°); Wiarton, (*ice 1 $\frac{1}{2}$ -in.*); St. Thomas, (*ice 1 $\frac{1}{4}$ -in.*); Petrolia, (28°); Alexandria, (30°); London, (31°); Guelph, Huntingdon, (30°); Durham, (28°); Coldwater, (27°); Rockliffe, (25°).
- 29th, Russell, (30°); Pattleford, (28°).
- 30th, Russell, (29°).
- 31st, Savanne, (32°).
- Thunder recorded on*
- 1st, Shannonville, Pelee Island, Peterboro, Ottawa.
- 2nd, Dorchester, N.B., Truro.
- 3rd, Joly.
- 6th, Portage la Prairie, Evandale.

- 7th, Hillview, Russell, Gladstone, Channel Island, St. Albans, Posen, Portage la Prairie, Rapid City, Cartwright, Craigilea.
 8th, Whiteside, Savanne, Gravenhurst, Joly, Clontarf, Gladstone, Mid Lothian, Uplands, Posen, Pembina Crossing.
 9th, Pelee Island, Brome, Cottam.
 10th, Cowal.
 12th, Truro.
 14th, Kilmahumaig.
 16th, Barkerville, Woodstock, N. B.
 18th, Keremeos, Winnipeg.
 19th, Russell, Glastonbury.
 20th, Stoney Creek, Fort Ellice, Blenheim, Scarboro, Wiarton, Deseronto, Alexandria.
 21st, Ridgetown, Kingsville, Birnam, Brome, Richmond, St. Hyacinthe, Elora, Galt, Thedford, Georgia, Wyoming, Thedford.
 22nd, Paris, St. Mary's, Scarboro, Nelson.
 23rd, Quamicham.
 25th, Pelee Island.
 26th, Pelee Island.
 27th, Russell, Portage la Prairie, Evandale, Selkirk.
 28th, Sunnyside, Gladstone, Channel Island, St. Albans, Posen, Pembina Crossing, Hanlan, Cartwright.
 29th, Evandale.
 30th, Sunnyside.
 31st, Ignace.

Auroras recorded on—

The class of aurora if noted by observer is given, I being brightest, II the feeblest in brilliancy.

- 1st, Savanne.
 2nd, Russell, III ; Cottam, IV.
 3rd, Cotham, IV ; Portage la Prairie, IV ; Winnipeg, IV.
 4th, Bognor, IV ; Savanne, Novar, IV ; Gravenhurst, IV ; Channel Island, III ; Egremont, IV ; Elora, Nelson, Sharon, II ; Posen, I ; Pembina Crossing, III ; Winnipeg, II.
 5th, Chicoutimi, IV ; Portage la Prairie, IV ; Port Arthur, II.
 6th, Savanne, Channel Island, IV ; Elora, Peterborough, III.
 7th, Sunnyside, III ; Cotham, III ; Chicoutimi, IV ; Pembina Crossing, III ; Winnipeg, IV ; Minnedosa, IV ; Father Point, IV.
 9th, Russell, II ; Stoney Creek, IV ; Cotham, III ; Pembina Crossing, III ; Swift Current, II.
 10th, Bognor, IV ; Novar, IV ; St. Albans, III ; Posen, IV.
 11th, Savanne, Chicoutimi, IV ; Pembina Crossing, I.
 13th, Hillview, Father Point, II ; Savanne, Russell, III ; Cotham, II ; St. Albans, II ; Posen, I ; Cook's Mills, Pembina Crossing, II ; Cartwright (fine), Edmonton, III.
 14th, Russell, III ; Dorchester, I ; Channel Island, III ; Cotham, I ; Winnipeg, IV ; Swift Current, III ; Port Arthur, I.
 15th, Russell, III ; Fort Ellice, II ; Channel Island, III.
 16th, Minnedosa, III.
 17th, Russell, III.
 20th, Russell, III.
 23rd, Peterborough.
 24th, Chicoutimi, IV.
 26th, Chicoutimi, Portage la Prairie, IV.
 27th, Russell, II ; St. Albans, II ; Posen, II ; Pembina Crossing, III ; Cartwright (fine).
 28th, Posen, I.

MIGRATION OF SPRING BIRDS.

Savallotes Treherne, 1st ; Birnam, 3rd ; Russell, 7th ; Portage la Prairie, 7th ; Paris, 9th ; Toronto, 9th ; Mid-Lothian, 9th ; Gladstone, 13th ; Fort Ellice, 16th ; Beatrice, 17th ; Dorchester, 18th ; Sombra, 23rd.

Bobolinks Posen, 8th.

Night Hawks—Lucknow, 23rd.

Yellow Birds—Egremont, 1st; Bognor, 9th; Sombra, 10th; Beatrice, 24th.

Wrens—Sombra, 12th; Gladstone, 19th.

Cat Bird—Sombra, 15th.

Humming Birds—Sombra, 4th; Birnam, 8th; Georgina, 14th; Galt, 19th; Bognor, 28th.

Oriole—Sombra, 8th; St. Mary's, 11th; Toronto, 14th; Birnam, 23rd.

Whip-poor-Will—Posen, 3rd; Egremont, 11th; Gladstone, 16th; Cornwall, 17th; Evandale, 17th; Sunnyside, 20th; Gravenhurst, 20th.

Fire Flies—Sombra, 24th; Lucknow, 29th; Gravenhurst, 30th; Egremont, 31st.

The following record of a brilliant meteor observed on the 3rd day of May is furnished by the Observer at Sombra, Ontario, Mr. W. S. Howell:—

On Sunday evening, the 3rd of May, about 6.45 p.m., standard time, a large blazing meteor passed over the central part of the Township of Sombra, passing to the southwest. I heard several persons speak who saw it, as a ball of fire with a fiery tail blazing behind it. It must have descended quite gradually to the ground; its line of motion being apparently at a low angle to the surface of the country, but the motion was very swift, as it passed out of view to the S.W. in a very few seconds indeed. As it disappeared, a tremendous explosion was heard (no doubt the noise was made by the motion of the meteor through the air), I heard the sound myself. It was not like thunder, nor like any cannon I ever heard, and the sound was somewhat prolonged, loudest when first heard. Mr. R. G. Allan who had been through the American civil war and marched with Sherman to Atlanta, said he never heard such a sound as that from all the cannons he had ever heard. It was heard far and wide in the Townships of Sombra, Dawn, Enniskillen, Moore, Camden, Chatham and Dover, but I did not learn of where it struck, and will not venture to write down mere rumors as facts. One man said he heard that it was seen near Detroit. The sky was clear and the sun was shining.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF MAY, 1891.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMALT	0 00	0 12	0 35	0 41	0 67	0 60	0 63	0 69	0 78	0 78	0 75	0 70	0 73	0 67	0 25	8.
WINNIPEG	02	54	67	72	75	74	73	70	71	69	67	66	63	63	40	..
.....
KINGSVILLE .....	..	06	37	54	65	68	73	79	81	84	77	73	63	55	24	..
WOODSTOCK .....	..	40	36	51	58	67	70	71	65	74	73	72	68	52	20	..
TORONTO .....	..	11	39	59	60	62	68	69	69	68	66	67	60	50	22	8.
LINDSAY	06	24	35	44	63	67	68	70	66	61	65	54	35	30	31	75
BARRIE .....	..	29	28	44	60	59	61	58	59	61	65	64	61	49	12	..
KINGSTON	8.	21	49	43	50	65	66	74	69	65	65	60	55	36	14	..
.....
.....
.....
MONTREAL	01	23	36	49	57	63	68	69	69	70	69	64	57	28	01	..
FREDERICTON .....	..	30	35	50	54	61	61	63	66	65	61	55	51	40	15	8.
SYDNEY .....	..	15	34	47	54	53	59	56	57	56	56	57	50	43	36	07

	ESQUIMALT.	WINNIPEG.		KINGSVILLE.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.			MONTREAL.	FREDERICTON.	SYDNEY.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)	0 53	0 62	..	0 56	0 53	0 51	0 49	0 46	0 49	..	..	0 55	0 47	0 46
MAXIMUM DAILY AMOUNT.	0 87	0 94	..	0 87	0 88	0 88	0 90	0 88	0 89	..	..	0 95	0 90	0 97
DATE	2	13	..	9	24	24	27	12	23	..	..	23	27	29
NO. OF DAYS COMPLETELY CLOUDED	2	1	..	1	0	1	1	1	1	..	..	2	5	3

PROBABILITIES.

The probabilities issued by this office at 11 p.m. each evening are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 553. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			Percentage Fully.
		No. Fully.	No. Partly.	No. Not.	
LOWER LAKE REGION.....	120	95	17	3	86.3
UPPER ST. LAWRENCE	115	91	18	6	87.0
LOWER ST. LAWRENCE.....	106	79	19	8	87.5
GULF.....	105	76	22	7	82.9
MARITIME PROVINCES	107	77	16	14	79.4
TOTAL	553	418	92	43	83.9

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by 2 and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at the "Probability Stations," as well as the telegraphic reports, are used.

The daily probabilities and storm warnings were issued by Probability Officer R. F. Stupart.

STORM WARNINGS.

During the month warnings on the approach of one storm was issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 11, of which 8, or 72.5 per cent., were verified. Three stations reported warnings received late, owing to delay in issue.

In connection with the warnings, predictions as to the probable direction of the winds were given and of the 11 warnings verified as to force, 11 or 100.0 per cent., were fully verified.

At 10.40 a.m. on the 22nd warnings were issued to Lakes, Erie and Ontario Stations to expect a moderate easterly gale in advance of a depression then over the Middle Mississippi Valley. Port Dalhousie reported a moderate N. E. gale during the 23rd, and Pelee Island also a moderate N.E. gale early on the 22nd. Elsewhere no storm was experienced. The depression dispersed on nearing the Lakes.

TORONTO OBSERVATORY MAGNETIC REVIEW FOR MAY, 1891.

The first two days were free from disturbance. Early on the 3rd a small disturbance appeared and continued until 10 a.m., after which a steady increase of westerly declination set in until 11.15 a.m. when a slow easterly movement commenced lasting until 1 p.m., after which a very steady curve followed. All throughout the 4th a slight disturbance prevailed, also on the morning of the 6th and all day of the 7th, in fact it was visible often on up to the 9th. There was nothing of importance shewn until the morning of the 13th when the magnets became slightly disturbed. Between 1 and 7 p.m. the declination needle moved east when the movements increased. After 4 a.m. of the 14th the disturbance became more active and all morning the magnets continued in a disturbed condition. There was a strong resemblance in the declination curves for the afternoons of the 13th and 14th. During the night of the 14th there were some rapid movements of the declination needle, a marked easterly extreme taking place at 8.08 p.m. After 9.55 p.m. a quick westerly swing brought the magnet to about its normal reading and it remained tolerably steady until after 3 a.m. of the 15th when quite a storm began. A well marked double westerly maximum was recorded at 4.09 and 8.50 a.m., the readings being then 42' west of the normal. The total range of declination on the 14th and 15th was 1° 30'. There were some rapid movements during this storm, an easterly sweep of 48' after 4.09 a.m. of the 15th, and between 7 and 9 a.m. the curve presents a constant vibration. The force magnets were considerably disturbed during the storm. On the 13th and 14th the horizontal force curve was very wavy. A sharp vibration of this magnet is shewn at 4.33 p.m., the initial swing was a decrease of force

followed immediately by an increase. After 5 p.m. the force gradually increased and a little after 6 p.m. the movements were considerably accelerated, a maximum being registered at 6.58 p.m. The force after this began to diminish in short vibrations until it reached its minimum at 9.20 p.m., the range for that period being .0060 C. G. S. Between 10 p.m. and 3 a.m. of the 15th a quiet curve ensued, and was followed on the morning of the 15th by some rapid changes. After 3 a.m. the force began to diminish until 7.45, when an increase set in and by noon the magnet was at its normal reading. The vertical component reached its maximum value at 6.56 p.m. of the 14th and its minimum at 4.11 a.m. of the 15th. A marked increase is shewn between 7.40 and 11.50 a.m. of the 14th, and also on the following morning, except on the latter date, the magnet was more disturbed.

Between 2 and 8 a.m. of the 16th, another storm was registered although not as active as the one on the 15th, still there were some important swings. The most westerly reading occurred at 4.50 and the easterly at 6.30 the range being 1° . After 4 a.m. both forces began to diminish until 5 a.m. The h. f. shews some quick swings between 6 and 7 a.m., and a noticable increase of both forces is shown after 0.30 p.m. attended by a gradual increase of westerly declination at first, followed in half an hour by a sharp easterly deflection. The movements of the force magnets then being considerably accelerated. After 2 p.m. the magnets gradually regained their normal readings and remained fairly steady until 6.25 p.m., when a sudden easterly sweep of the declination needle took place; the extreme was reached at 6.50 followed by a corresponding westerly rise of $37'$, after reaching its normal position it came to rest very quickly. During the time the declination needle was moving east the horizontal component was little affected, and it was not until the westerly swing that the h. f. changed, an increase of force being then shewn. The v. f. curve presented nothing of importance.

A slight disturbance appeared on the evening of the 17th, and continued to act up to the morning of the 24th, this was followed by a quiet period, and it was not until the night of the 26th that the magnets shew any changes; a slight disturbance then springing up and was visible up to the 30th; it was more active on the night of the 27th. During the afternoon of the 28th, the h. f. was changing considerably. On the last day of the month the magnets were quiet and changed little from their normal values.

On the 1st, 3rd, 4th, 9th, 11th, 12th, 13th, 16th, 22nd, 23rd, 26th, 27th and 31st, the sky was clear but no aurora was observed; on all other nights clouds or haze would have hidden any aurora which might have existed. Auroras were general observed throughout the Dominion on the 4th, 5th, 13th, 14th and 15th, the display on the 13th, 14th and 15th, at a number of stations being brilliant (class I).

CHARLES CARPMAEL,

Director.

METEOROLOGICAL OFFICE,

TORONTO, July 8th, 1891.

Monthly Weather Review.

JUNE, 1891.

INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraphic reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief Signal Officer, Washington, D.C.

ATMOSPHERIC PRESSURE.

The average pressure, as determined from the observations taken at telegraph reporting stations, was above the normal of seventeen years in Ontario and Quebec, and below in the Maritime Provinces. In Manitoba and the Northwest it was about normal.

On the 1st a small depression moved slowly eastward across Canada from the Lake Region to the Gulf, and a deeper depression developed in the Western States, while feeble anti-cyclonic movements were apparent north of the Lake Region and in the Northwest Territories; a few local thunderstorms occurred during the day in Ontario and Quebec, where the weather was generally fair and warm, while in the Maritime Provinces it was mostly cloudy with light rains. For the next two days the western depression moved very slowly eastward with diminishing energy, and increasing anti-cyclonic movements prevailed over Canada, with cool, showery weather in Ontario and the Maritime Provinces, and fair weather in the Northwest Territories and Manitoba. The charts of the 4th, 5th and 6th showed the anti-cyclone moving slowly over the Lake Region, and fair weather prevailing in Canada with temperature about normal, or a little below, from the Lakes east, and a little above in Manitoba and the Northwest Territories.

During the first four days of the week ending the 13th, the pressure was mostly high, and the weather continued very fine over Canada from Ontario east, while in the Northwest cyclonic conditions prevailed and the weather was showery. There was a break in the high pressure and fair weather in Ontario on Thursday the 11th, as a small depression moved across the country, causing local showers and thunder storms in Ontario, and next day as it passed eastward, a few little showers in the Maritime Provinces.

On the 12th and 13th the pressure was highest over the Lake Region, while it continued low in the Northwest, and there was a moderate cyclonic movement over the Gulf and off the Nova Scotian coast; showery weather prevailed in Manitoba and the Northwest Territories, decidedly warm in Manitoba and cooler westward; from the Lake Region eastward it was very fine and warm, the temperature in Nova Scotia on the 12th, at many points, exceeding 80° for the first time this season.

The week ending the 21st began with an area of high pressure, central over the Middle Atlantic States, which extended its influence for fine, very warm weather over Ontario and Quebec during Sunday and Monday. In the Maritime Provinces the pressure was lower and the weather cool and showery.

On the 15th cyclonic movements which for some time had prevailed in Manitoba and the Northwest, attended by heavy local rains, gave way before an anti-cyclonic development which spread southward over Manitoba and Assiniboia, there bringing fair but cool weather, while nearer the Rockies there was a change from cool to decidedly warm weather. The cyclonic movements were meanwhile transferred eastward and southward; one small depression moving across the Lower St. Lawrence Valley and Gulf gave local rains in Quebec and the Maritime Provinces on the 16th, and at night thunder storms and sharp squalls in Cape Breton.

In parts of Ontario, on the 16th, with a moderate southwesterly gradient, the temperature reached or exceeded 90°, then for the balance of the week, very generally in the Lake Region, the pressure was low and weather cloudy and showery, while in Quebec and the Maritime Provinces the pressure differed little from normal, and the weather was fine and moderately warm.

The week ending the 28th began with the pressure in Canada for the most part below the average, the weather showery in Ontario, but elsewhere fine and warm, particularly in parts of Quebec and New Brunswick, where the temperature exceeded 90°. On the 22nd the pressure steadily increased in the Maritime Provinces with cool easterly winds, while the centre of low pressure, which for many days had hovered in the neighborhood of the Lake Region, began an easterly movement; on the 23rd it was moving slowly across the St. Lawrence Valley to New Brunswick, causing a rainy day with strong winds over the greater part of Quebec and the Maritime Provinces. At the same time there was a recovery of pressure over the Lakes with warm, bright weather, while in the North-West Territories there was a re-development of cyclonic conditions with strong winds and heavy local rains.

There were two well marked features during the last part of the week, the first was the development of the Maritime Province low area and its subsequent hovering to the southward of Nova Scotia, causing a moderate to fresh northeasterly gale and very cool, rainy weather throughout the Maritime Provinces until the end of the month; the other was the appearance of an important anti-cyclone to the northward of Manitoba on the 25th, and its movement eastward and southward, bringing fine weather in Ontario and Quebec until the end of the week. As the anti-cyclone passed out of the North-West on the 26th, cyclonic conditions became general between the Lake Region and Mississippi and the Mountains, accompanied by cool rainy weather. This wet weather lasted until, on the 28th, the centre of disturbance moved to the Lake Region where, however, there was no precipitation although a considerable decrease in pressure occurred.

TEMPERATURE.

The average temperature as determined from the observations taken at telegraph reporting stations, was slightly above the normal of seventeen years in Ontario, and below the normal in the Maritime Provinces and in Manitoba.

The highest and lowest temperatures in each Province during June were:—

British Columbia, 95°·0 on 27th, at Quamichan; 31°·0 on 9th, at Barkerville.

N. W. Territories, 88°·0 on 17th, at Medicine Hat; 23°·0 on 3rd, at Oonikup.

Manitoba, 90°·0 on 22nd, at Oak Bank; 24°·5 on 4th at Minnedosa.

Ontario, 96°·0 on 15th, at Stoney Creek; 96°·0 on 14th, at Renfrew; 21°·5 on 5th at Mattawa.

Quebec, 92°·0 on 23rd at Chicoutimi; 31°·5 on 3rd, at Quebec.

New Brunswick, 94°·5 on 21st, at Chatham; 30°·0 on 9th, at Bathurst; 30°·0 on 5th, at Parker's Ridge.

Nova Scotia, 84°·2 on 12th, at Halifax; 29°·0 on 5th, at Truro.

P. E. Island, 84°·0 on 12th, at Georgetown; 33°·5 on 5th, at Kilmahumaig.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, JUNE, 1891.

STATION.	PRESSURE IN INCHES.				TEMPERATURE OF AIR.				MEAN TEMPERATURE OF HUMIDITY.				DIRECTION OF WIND FROM.				VELOCITY OF WIND.				PRECIPITATION.													
	Mean actual.		Mean reduced.		Highest.		Lowest.		Range.		Mean.		Diff. from average.		Years observed.		Highest.		Lowest.		Range.		Mean.		Diff. from average.		Years observed.		No. of fair days.		No. of Auroras.		No. of Thunderstorms.	
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
Albany	29.70	30.03	29.58	0.75	61.1	-3.0	78.8	0	28.4	1	25.6	40.3	6	11	2	3	4	6	8	16	4	6	60	29.0	7W	4.34	1.50	11	19	0	0	0	0	0
Albany	29.80	30.17	29.58	0.75	55.1	-1.1	83.5	17	33.0	9	23.2	35.0	6	11	2	3	4	6	8	16	4	6	60	11.7	8W	2.69	1.0	10	14	16	0	0	0	0
Albany	29.85	30.23	29.57	0.86	52.5	-10.8	70.0	22	30.0	18	21.6	37.4	6	11	2	3	4	6	8	16	4	6	60	22.0	7SW	2.32	0.02	7	23	0	0	0	0	0
Albany	29.85	30.23	29.57	0.86	56.4	-5.7	80.0	16	34.6	6	21.6	37.4	6	11	2	3	4	6	8	16	4	6	60	22.0	7SW	2.32	0.02	7	23	0	0	0	0	0
Albany	29.85	30.23	29.57	0.86	55.4	-5.7	84.5	22	28.0	6	21.6	37.4	6	11	2	3	4	6	8	16	4	6	60	22.0	7SW	2.32	0.02	7	23	0	0	0	0	0
Albany	29.85	30.23	29.57	0.86	55.4	-5.7	84.5	22	28.0	6	21.6	37.4	6	11	2	3	4	6	8	16	4	6	60	22.0	7SW	2.32	0.02	7	23	0	0	0	0	0
Albany	29.85	30.23	29.57	0.86	55.4	-5.7	84.5	22	28.0	6	21.6	37.4	6	11	2	3	4	6	8	16	4	6	60	22.0	7SW	2.32	0.02	7	23	0	0	0	0	0
Albany	29.85	30.23	29.57	0.86	55.4	-5.7	84.5	22	28.0	6	21.6	37.4	6	11	2	3	4	6	8	16	4	6	60	22.0	7SW	2.32	0.02	7	23	0	0	0	0	0
Albany	29.85	30.23	29.57	0.86	55.4	-5.7	84.5	22	28.0	6	21.6	37.4	6	11	2	3	4	6	8	16	4	6	60	22.0	7SW	2.32	0.02	7	23	0	0	0	0	0
Albany	29.85	30.23	29.57	0.86	55.4	-5.7	84.5	22	28.0	6	21.6	37.4	6	11	2	3	4	6	8	16	4	6	60	22.0	7SW	2.32	0.02	7	23	0	0	0	0	0
Albany	29.85	30.23	29.57	0.86	55.4	-5.7	84.5	22	28.0	6	21.6	37.4	6	11	2	3	4	6	8	16	4	6	60	22.0	7SW	2.32	0.02	7	23	0	0	0	0	0
Albany	29.85	30.23	29.57	0.86	55.4	-5.7	84.5	22	28.0	6	21.6	37.4	6	11	2	3	4	6	8	16	4	6	60	22.0										

ONTARIO—*Conclu le 1.*

Novato.....	61.9	+ 0.1	4 90.6	15	27.4	5	35.0	48.7	5	1	0	12	2	5	3	12	3	12	37	90	1	IV	26NW	0.99	-1.41	4.26	2	3	1
Peterborough.....	65.6	.....	.....	.....	40.0	5	27.4	45.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wainstead.....	62.3	+ 0.8	3.91	4	15	27.9	5	34.8	48.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Minden.....	69.1	+ 5.2	2.93	0	16	45.0	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shannonville.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

QUEBEC:

Montreal.....	29 32 30	25 29 62	0 63	65.2	- 0.7	17 90.0	16	40.4	3	20.0	27.5	51.6	64	6	1	106	115	24	79	46	257	59	33	1	720	15.0	23.9	15 SW	2.75	-1.33	8.22	0	2	0
Huntingdon.....	29 52	29 51	29 09	0 82	63.5	- 0.6	21 91.0	16	34.0	5	23.6	39.0	4	0	0	21	11	5	1	40	8	2	0	90	II	IV	18 NE	2.36	-0.64	7.23	0	3	0
St. Hyacinthe.....	.....	.....	.....	.....	65.2	- 1.0	1 89.0	16	37.0	5	24.0	37.0	.....	5	0	6	0	1	0	3	2	15	2	0	29	III	.....	.....	.....	.....	.....	.....	.....
Richmond.....	.....	.....	.....	.....	61.8	- 1.0	13 89.1	16	33.4	6	26.3	39.4	.....	5	0	1	3	40	0	0	0	0	0	0	90	III	.....	.....	.....	.....	.....	.....	.....
Chicoutimi.....	.....	.....	.....	.....	62.1	+ 3.6	14 92.0	23	31.5	3	23.1	34.2	.....	4	1	5	40	0	0	0	0	0	0	45	0	90	III	.....	.....	.....	.....	.....	.....
Quebec.....	29 01	30 17	29 58	0 59	60.7	- 0.2	17 87.5	24	37.2	4	22.3	36.0	.....	5	2	2	19	4	0	4	6	10	7	8	60	.....	.....	.....	.....	.....	.....	.....	.....
Grindstone.....	29 57	30 16	29 52	0 64	49.1	.....	70.0	12-21	34.0	10	13.3	25.0	.....	6	8	12	5	10	6	8	10	3	6	2	60	.....	.....	.....	.....	.....	.....	.....	.....
Anticosti, S.W. P.....	.....	.....	.....	.....	49.1	- 0.7	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Brome.....	.....	.....	.....	.....	61.3	.....	87.0	16	32.0	5	.....	.....	.....	4	3	25	6	0	3	35	1	18	2	0	90	.....	.....	.....	.....	.....	.....	.....	.....
Father Point.....	.....	29 58	30 10	29 52	0 67	50.5	- 2.5	17 73.3	20	37.0	4	.....	.....	7	9	1	5	20	0	0	5	20	2	5	60	.....	.....	.....	.....	.....	.....	.....	.....
Point des Monts.....	.....	.....	.....	.....	50.4	- 1.1	1 77.0	20	40.0	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cape Chatre.....	.....	.....	.....	.....	50.4	- 4.3	7 69.0	19	41.0	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bicquet.....	.....	.....	.....	.....	48.9	- 1.0	8 65.0	19	40.0	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cape Magdalen.....	.....	.....	.....	.....	51.6	- 2.4	8 66.0	23	37.0	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

NEW BRISBICK:

Fredericton.....	29 50	30 20	29 53	0 66	50.8	- 1.9	18 86.0	17	37.0	5	20.8	33.1	50.8	69	7	11.4	7	21	6	5	9	14	10	12	3	90	6.4	12.0	28 NE	2.20	-0.50	14.16	0	2	0
Chatham.....	29 59	30 14	29 48	0 66	57.9	- 1.5	17 94.5	21	38.5	5	20.5	39.5	.....	6	9	15	9	2	0	5	9	4	3	13	60	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bathurst.....	29 54	30 18	29 47	0 61	61.6	- 1.0	17 96.0	21	30.0	9	23.9	39.0	.....	6	8	1	3	22	0	6	3	0	11	39	85	1	VII	28 E	2.04	-1.78	13.17	0	0	0
St. Andrews.....	29 58	30 16	29 53	0 63	59.0	- 1.1	17 96.6	13	37.0	5	19.0	37.0	4	5	1	14	0	1	5	0	2	9	19	60	1
Grand Manan.....	.....	.....	.....	.....	53.1	- 1.6	7 80.1	16	40.0	5	16.1	22.6	.....	5	8	11	4	4	6	7	8	4	9	7	60	.....	.....	.....	.....	.....	.....	.....	.....	.....
Point Lepreau.....	.....	.....	.....	.....	53.2	- 1.3	15 79.0	13	43.0	4	.....	.....	.....	6	4	5	17	11	12	1	16	7	9	0	78	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. John.....	29 58	30 23	29 52	0 71	57.5	- 1.9	7 80.2	13	40.5	5	16.0	25.9	49.3	74	7	8	26	20	18	17	15	3	1	15	23	138	5.5	25.3	28 N	2.33	-1.35	13.17	0	2	2
St. John's City.....	29 50	30 16	29 52	0 64	55.8	- 0.9	31 78.0	13	44.0	4	12.5	.....	.....	8.1	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	51.6	- 4.4	3 78.0	21	34.0	8	14.1	32.0	
.....	56.7	11 90.0	20	34.0	8	23.3	40.0	
.....	57.0	- 2.1	4 87.0	21	30.0	5	20.8	37.0	
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NEW BRISBICK:

.....	51.1	- 0.4	17 87.2	12	30.5	5	14.9	39.2
.....	50.3	- 5.3	19 83.2	12	32.4	5	20.6	34.6	11.2	80
.....	51.1	- 0.9	11 74.0	14	40.0	5	16.0	23.6
.....	.....	.....	.....	.....	55.6	- 2.5	18 82.6	21	29.0	5	21.7	40.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	55.4	- 2.2	13 87.0	12	35.0	10	17.4	35.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	57.4	- 0.8	11 78.0	16	48.0	27	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	47.6	- 1.9	7 78.0	25	40.0	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

NEW BRISBICK:

.....	.....	.....	.....	.....	49.2	- 0.2	19 79.0	20	32.0	1	16.6	35.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	51.5	.....	83.2	24	63.5	17	19.7	15.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	50.9	- 1.4	12 87.6	12-21	30.5	5	19.5	35.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	50.7	- 2.5	6 84.0	12	35.0	10	17.5	35.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	54.5	- 0.9	19 77.4	21	36.8	5	15.2	21.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

NEW BRISBICK:

.....	52.5	- 1.4	12 87.6	12-21	35.0	8	14.1	42.2	51.7	88	6	3	11	8	1	20	36	64	6	6	28	180	9.3	21.7	27 SW	1.26	13.17	0	0	0
.....	.....	.....	.....	.....	52.9	- 1.4	4 95.0	25	32.0	8	26.2	42.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	31.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	52.6	- 6.1	3 67.6	21	26.0	8	26.9	36.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....</

STATIONS RECEIVED TOO LATE FOR MAY REVIEW.

PROVINCE.	STATION.	MEAN TEMP.	HIGHEST TEMPERATURE.		LOWEST TEMPERATURE.		PRECIPITATION.		AURORAS.	THUNDER STORMS.
			Temp.	Date.	Temp.	Date.	Amount.	Days.		
		°	°		°		in.			
B. Columbia.....	Fort Simpson.....	48.23	69.0	23	29.6	7	2.98	9		
N. W. Territories.....	Pheasant Forks.....	58.17	86.0	16	28.0	3	....	9		
	Oonikup.....	42.67	79.5	7	7.0	3	0.86	11		
Ontario	Alton.....	49.95	77.0	31	24.4	5	0.56	10		21.

PRECIPITATION.

The rainfall throughout the Dominion, except in Nova Scotia, Manitoba and portions of the Territories, has been below the average, the defect being greatest in the western and northern parts of Ontario, and in the Province of Quebec. In Manitoba the amount was very large and although general it was especially heavy in the eastern and south-western parts of the Provinces.

The distribution is as follows :—

In BRITISH COLUMBIA, it was 2.75 in., or 1.31 less than 1890.

In the TERRITORIES it was 4.84 in. or 2.06 above the average.

In MANITOBA it was 5.77 in., or 2.21 in. above the average.

In ONTARIO West and South-West district it was 1.98 in., or 1.01 in. below the average. North and North-West district it was 1.11 in., or 1.49 below the average. Central district it was 2.49 in., or 0.05 in. above the average. East and North-East district it was 1.76 in.; or 0.52 in. below the average.

In QUEBEC it was 1.93 in., or 1.13 in. below the average.

In NEW BRUNSWICK it was 2.88 in., or 0.58 in. above the average.

In NOVA SCOTIA it was 3.71 in., or 0.56 in. below the average.

In PRINCE EDWARD ISLAND it was 2.46 in., or 0.36 in. below the average.

Rainfall 5 in. and upwards during month : —

BRITISH COLUMBIA.—Maple Grove, 6.01 in.

N. W. TERRITORIES. Swift Current 6.80 in.; Qu'Appelle, 7.19 in.; Cotham, 7.25 in.; Glen Adelaide, 7.03 in.; Oonikup, 5.08 in.; Wallace, 10.12 in.

MANITOBA. Minnedosa, 5.43 in.; Stony Mountain, 10.30 in.; Portage la Prairie, 8.16 in.; Fort Ellis, 5.12 in.; Brandon, 6.13 in.; Posen, 8.28 in.; Sunnyside, 6.23 in.; St. Alban, 6.28 in.; Burnside, 5.87 in.; Brandon 5.86 in.; Napinka, 7.61 in.; Dominion City, 5.28 in.; Kola, 5.15 in.; Hanlan, 7.74 in.; Beaver Creek, 7.60 in.; Selkirk, 5.86 in.; Shoal Lake, 5.62 in.; Gretna, 6.32 in.; Treherne, 6.49 in.; Manitou, 5.18 in.; Greenwood, 7.82 in.; Norquay, 5.07 in.; Oak River, 5.77 in.; Foxton 7.58 in.; Elkhorn, 5.15 in.; Clandeboye, 7.51 in.; Hartney, 7.91 in.; Craigilea, 5.30 in.; Rapid City, 6.24 in.; Rothwell, 5.67 in.; Gladstone, 6.06 in.

ONTARIO. Little Forks, 6.70 in.; Lindsay, 5.24 in.

NOVA SCOTIA. Sydney, 5.65 in.; Port Hastings, 7.06 in.

NEWFOUNDLAND. St. Johns 7.83 in.; Bermuda, 5.73 in.

Rainfall 1 in. and upwards in 24 hours.

1st, White River, 1.08 in.

2nd, Little Forks, 2.00 in.

7th, Oak River, 1.02 in.; Wallace, 1.13 in.

9th, Sunnyside, 2.15 in.; Gretna, 1.75 in.; Pembina Crossing, 2.30 in.; Treherne, 1.98 in.; Pembina Crossing, 2.44 in.; Napinka, 1.30 in.; Dominion City, 1.51 in.; Morris, 1.00 in.; Beaver Creek, 1.16 in.; Selkirk, 1.22 in.; Foxton, 2.22 in.; Pilot Mound, 1.52 in.; Morden, 1.98 in.; Craigilea, Rosebery, 1.09 in.; Rothwell, 2.41 in.; Portage la Prairie, 1.47 in.; Stony Mountain, 1.40 in.; Winnipeg, 1.43 in.; Bermuda, 1.26 in.

- 10th, Carman, 1'17 in. ; Hanlan, 2'24 in. ; Greenwood, 2'62 in. ; Norquay, 1'11 in. ; Stony Mountain, 1'20 in. ; Conestogo, 1'03 in. ; Lindsay, 2'78 in.
- 11th, Wilton Grove, 1'50 in. ; Georgina, 2'38 in. ; Orillia, 1'09 in. ; Scarboro', 1'28 in. ; Coldstream, 1'01 in. ; Ridgetown, 1'53 in. ; St. Mary's, 1'08 in. ; Lindsay, 1'03 in. ; Napinka, 2'70 in. ; Beaver Creek, 1'44 in. ; Cartwright, 1'04 in. ; Clandeboye, 1'32 in. ; Aurora, 1'59 in.
- 12th, Orangeville, 1'02 in. ; Stony Mountain, 1'00 in.
- 13th, Dominion City, 1'44 in. ; Hanlan, 1'06 in. ; Selkirk, 1'03 in. ; Sunnyside, 1'62 in. ; Gretna, 1'05 in. ; Posen, 3'12 in. (parts of three days); Treherne, 1'13 in. ; Foxton, 1'88 in. ; Clandeboye, 1'28 in. ; Hartney, 1'25 in. ; Fort Ellice, 1'20 in. ; Killarney, 1'03 in. ; Portage la Prairie, 1'81 in. ; Stony Mountain, 2'10 in. ; Qu'Appelle, 2'31 in. ; Fort Ellice, 1'20 in. ; Posen, 3'12 in. ; Sunnyside, 1'62 in. ; Bermuda, 1'79 in.
- 14th, St. Albans, 1'12 in. ; Barclay, 1'20 in. ; Wallace, 1'93 in. ; Swift Current, 2'20 in. ; St. Johns, Nfld., 1'36 in.
- 16th, Toronto, 1'28 in. ; Clontarf, 1'03 in. ; Rose Hill, 1'31 in. ; Point des Monts, 1'00 in.
- 17th, Wilton Grove, 1'50 in. ; Lyons, 1'69 in. ; Cottam, 1'08 in. ; Wiarton, 1'10 in. ; Presqu'Isle, 1'00 in. ; Niagara Falls S., 1'84 in. ; St. Thomas, 2'08 in. ; Port Hope, 1'01 in. ; Durham, 1'00 in.
- 18th, Wyoming, 1'35 in. ; Watford, 1'00 in. ; Sarnia, 1'02 in.
- 20th, Little Forks, 1'00 in.
- 21st, Clontarf, 1'19 in. ; Barclay, 1'10 in. ; Little Forks, 1'00 in. ; Ottawa, 1'72 in.
- 22nd, Selkirk, 1'00 in. ; Oak River, 2'25 in. ; Sunshine, 1'38 in. ; London, 1'10.
- 23rd, Napinka, 1'50 in. ; Kola, 1'20 in. ; Hanlan, 2'62 in. ; Hillview, 1'15 in. ; Shoal Lake, 3'30 in. ; Foxton, 1'76 in. ; Elkhorn, 1'26 in. ; Clandeboye, 1'90 in. ; Fort Ellice, 1'00 in. ; Gladstone, 2'31 in. ; Cotham, 1'57 in. ; Glen Adelaide, 2'39 in. ; Brome, 1'02 in. ; Gladstone, 3'37 in. ; Parker's Ridge, 1'50 in. ; Port Hastings, 1'15 in. ; Digby, 1'30 in. ; Stony Mountain, 1'60 in. ; Minnedosa, 1'56 in. ; Qu'Appelle, 1'24 in. ; Glen Adelaide, 2'39 in. ; Fort Ellice, 1'00 in. ; Hillview, 1'15 in. ; Cotham, 1'57 in. ; Gladstone, 3'37 in. ; Pictou, 1'30 in. ; Swift Current, 1'60 in. ; Halifax, 1'17 in. ; Grand Manan, 1'68 in. ; St. Andrews, 1'68 in.
- 24th, Wallace, 4'12 in. ; Georgetown, P. E. I., 1'15 in. ; Oonikup, 1'26 in. ; Russell, 1'25 in. ; Fredericton, 1'12 in.
- 26th, Brandon Exp. Farm, 1'18 in. ; Wallace, 1'66 in. ; Brandon, 2'77 in. ; Portage la Prairie, 1'85 in. ; Burnside, 4'31 in. ; St. Albans, 2'48 in. ; Russell, 1'72 in. ; Cotham, 2'16 in. ; Glen Adelaide, 2'62 in. ; Roseberry, 1'33 in. ; Rothwell, 2'12 in. ; Fort Ellice, 1'86 in. ; Turtle Mountain, 1'48 in. ; Gladstone, 1'51 in. ; Napinka, 1'94 in. ; Carman, 1'25 in. ; Kola, 2'17 in. ; Hanlan, 1'33 in. ; Morris, 1'35 in. ; Beaver Creek, 3'02 in. ; Selkirk, 1'20 in. ; Hillview, 1'28 in. ; Sunnyside, 1'89 in. ; Treherne, 2'08 in. ; Cartwright, 1'54 in. ; Greenwood, 1'66 in. ; De Clare, 2'20 in. ; Norquay, 1'93 in. ; Oak River, 1'52 in. ; Cartwright, 1'50 in. ; Foxton, 1'62 in. ; Pilot Mound, 2'25 in. ; Elkhorn, 2'15 in. ; Clandeboye, 1'66 in. ; Elm Valley, 1'16 in. ; Craigilea, 1'80 in. ; Rapid City, 3'00 in. ; Qu'Appelle, 1'39 in. ; Glen Adelaide, 2'62 in. ; Portage la Prairie, 1'85 in. ; Edmonton, 1'38 in. ; Fort Ellice, 1'86 in. ; Brandon, 1'18 in. ; Hillview, 1'28 in. ; Sunnyside, 1'89 in. ; Cotham, 2'16 in.
- 27th, Oak Lake, 1'47 in. ; Gretna, 2'00 in. ; Posen, 2'32 in. ; Glastonbury, 1'08 in. ; Brandon, 2'01 in. ; Buda, 1'02 in. ; Killarney, 1'22 in. ; Cow Bay, 1'47 in. ; Portage la Prairie, 1'67 in. ; Port Hastings, 3'20 in. ; Stony Mountain, 2'81 in. ; Minnedosa, 1'53 in. ; Portage la Prairie, 1'67 in. ; Edmonton, 1'78 in. ; Brandon, 2'01 in. ; Posen, 2'32 in. ; Cotham, 1'35 in. ; Battleford, 1'10 in. ; Sydney, 1'69 in. ; St. Albans, 2'48 in.
- 28th, Napinka, 1'04 in. ; Hartney, 2'50 in. ; Ignace, 1'80 in. ; Savanne, 1'10 in. ; Georgetown, 1'53 in. ; St. Johns, Nfld., 1'32 in. ; Little Forks, 1'00 in. ; Sydney, 1'54 in.
- 29th, Ignace, 1'32 in. ; Savanne, 1'08 in. ; Cow Bay, 1'74 in. ; Pictou, 1'20 in. ; Little Forks, 1'00 in.
- 30th, St. Johns, Nfld., 2'94 in.

Thunder recorded on—

- 1st, Chicoutimi, Bancroft, Kingsville, Barkerville, Ridgetown, Bathurst.

- 2nd, Toronto, Lucknow, Kingsville, Birnam, Barkerville, Zurich, Sunshine, Georgetown, Conestogo, Durham, Alton, Egremont.
- 3rd, Galt, Kingsville, Blenheim, Sombra, Pictou.
- 4th, Cotham, Pelee Island.
- 5th, Banff.
- 6th, Cotham.
- 7th, St. Albans, Hillview, Pembina Crossing, Rapid City, Alton.
- 8th, St. Albans, Pembina Crossing, Norquay.
- 9th, Hanlan, Selkirk, Sunnyside, Clandeboye, Roseberry, Rothwell, Turtle Mountain, Killarney, Channel Island, Posen, Cotham, Winnipeg.
- 10th, Ottawa, Conestogo, Lindsay, Durham, Georgina, Lakefield, Alton, Beatrice, Egremont, Pembina Crossing, Roseberry, Toronto, Bognor, Cottam, Bancroft, Gravenhurst, St. Mary's Kingsville, Birnam, Zurich, Whiteside, Eau Claire, Lion's Head, Stony Creek, Sombra, Owen Sound.
- 11th, St. Albans, Pembina Crossing, Rapid City, Roseberry, Toronto, Portage la Prairie, Kilmahumaig, Point Escuminac, Cartier, Bognor, Chicoutimi, Channel Island, Fort Ellice, Cottam, Galt, St. Mary's, Lucknow, Kingsville, Birnam, Wilton Grove, Cotham, Paris, Drayton, Durham, Sharon, Stony Creek, Sombra, Clontarf, Georgina, Haliburton, Blenheim, Ottawa, London, Conestogo, Lindsay, Huntingdon, Lakefield, Alton, Beatrice, Egremont, Minden, Novar.
- 12th, St. Albans, Morris, Hanlan, Hillview, Treherne, Pembina Crossing, Cartwright, Elkhorn, Clandeboye, Rapid City, Roseberry, Rothwell, Turtle Mountain, Quamichan, Portage la Prairie, Kilmahumaig, Gladstone, Buda, Chicoutimi, Posen, Agassiz, Fort Ellice, Cotham, Sunnyside, Cotham, Pelee Island, Winnipeg, Kilmahumaig, Truro, Bathurst, Fredericton.
- 13th, Norquay, Pilot Mound, Clandeboye, Craigilea, Rapid City, Rothwell, Fort Ellice, Turtle Mountain, St. Albans, Dominion City, Kola, Hanlan, Sunnyside, Treherne, Pembina Crossing, Quamichan, Portage la Prairie, Gladstone, Posen, Brandon, Winnipeg.
- 14th, Dominion City, Norquay, Portage la Prairie, Savanne, Sunnyside, Winnipeg, Swift Current.
- 15th, Norquay, Bognor, Cottam, Bancroft, Kingsville, Pelee Island, Ridgetown, London, Sombra, Conestogo, Lindsay, Sharon, Georgina, Haliburton, Norwood, Alton, Beatrice, Egremont, Minden.
- 16th, Toronto, Georgetown, P.E.I., Cartier, St. Hyacinthe, Digby, Richmond, Point Lepreaux, Cottam, Bancroft, Galt, St. Mary's, Dorchester, N.B., Kingsville, Brantford, Birnam, Paris, Pelee Island, Ridgetown, Eau Claire, Georgetown, Truro, Ottawa, Deseronto, Conestogo, Lindsay, Huntingdon, Fredericton, Sharon, Sombra, Clontarf, Paris, Georgina, Haliburton, Renfrew, Lakefield, Egremont, Joly, Novar, Shannonville.
- 17th, Cottam, Galt, St. Mary's, Kingsville, Ridgetown, Blenheim, Digby, Truro, Lakefield, Egremont.
- 18th, Agassiz, Cottam.
- 19th, Bognor, Swift Current, Durham, Egremont.
- 20th, Roseberry, Portage la Prairie, Gladstone, Bognor, Lucknow, Little Forks, Durham, Lakefield, Egremont.
- 21st, St. Albans, Rapid City, Roseberry, Bognor, Posen, Brandon, Cottam, Cotham Little Forks, Ottawa, Clontarf.
- 22nd, Toronto, Quamichan, Portage la Prairie, Gladstone, Cartier, Bognor, Channel Island, Russell, St. Albans, Hanlan, Hillview, Sunnyside, Treherne, Clandeboye, Rapid City, Posen, Fort Ellice, Bancroft, Gravenhurst, Brantford, Pelee Island, Eau Claire, Ottawa, Lindsay, Sharon, Sombra, Clontarf, Norwood, Alton, Egremont, Joly, Minden.
- 23rd, Kola, Hillview, Treherne, Clandeboye, Craigilea, Roseberry, Fort Ellice, Portage la Prairie, Gladstone, Posen, Winnipeg, Digby.
- 24th, Winnipeg, Portage la Prairie, Pictou, Georgetown, Dorchester, N. B., Treherne, Rothwell, Turtle Mountain, Parker's Ridge, Kilmahumaig, Georgetown, Killarney, Point Escuminac, Digby, Agassiz, Fort Ellice.

- 25th, Bancroft, Huntingdon, Russell, St. Albans, Kola, Hanlan, Oak Lake, Hillview, Treherne, Pembina Crossing, Norquay.
 26th, Rapid City, Roseberry, Rothwell, Turtle Mountain, Portage la Prairie, Gladston, Killarney, Channel Island, Posen, Fort Ellice, Sunnyside, Winnipeg, Russell.
 27th, St. Albans, Kola, Oak Lake, Portage la Prairie, Gladstone, Buda.
 28th, Savanne, Posen, Little Forks
 29th, Buda, Sombra.
 30th, Russell, Kola, Rapid City, Roseberry, Cottam, Gravenhurst, Russell.

Snow or Frost noted on—

- 1st, Richmond, *heavy hailstorm*.
 2nd, Oak Lake, *snow*.
 3rd, Eau Claire, *snow*; Savanne, *snow*; Hanlan, *frost*; Norquay, *frost*; Elkhorn, *ice*; Mellendean, *frost*; Fort Ellice, *frost*; Turtle Mountain, *frost*.
 4th, Brandon, *frost*; Killarney, Man., *frost, garden stuff and barley frozen*; Hanlan, *frost*; Portage la Prairie, *frost, damage to garden stuff*; Hillview, *ice $\frac{1}{2}$ in.*; Oak Bank, *frost*; Mellendean, *frost*; Fort Ellice, *destructive frost*.
 5th, Sprucedale, *hard frost*; Clontarf, *frost*; Birnam, *frost*; Barkerville, *snow*; Brome, *frost*; Parker's Ridge, *ice*; Minden, *tender vegetables cut*; Egremont, *frost*; Uplands, *frost*; Bancroft, *killing frost*; Mid-Lothian, *ice*; St. Thomas, *frost*; Kola, *ice $\frac{1}{2}$ in. thick*; Hanlan, *frost*.
 6th, Sprucedale, *frost*; Clontarf, *frost*; Barkerville, *snow*; Minden, *frost*; Uplands, *frost*; Galt, *frost*; Mid-Lothian, *frost*.
 7th, Minden, *frost*; Egremont, *frost*.
 26th, Sprucedale, *frost*.
 27th, Sprucedale, *frost*; Egremont, *frost*; Mid-Lothian, *frost*.
 28th, Sprucedale, *frost*; Peterborough, *frost*; Mid-Lothian, *frost*.
 29th Peterborough, *potatoes frozen*.

Dr. Watt reports from Barkerville, B.C., higher up the Mountain, snow fell to a depth of 5 or 6 inches on 6th and 7th.

Mr. Criddle at St. Albans, Man., reports on 6th, a superb meteor in S. at 11.55 solar time.

Aurora recorded on—

The class of aurora if noted by observer is given (I) being brightest, (IV) the feeblest in brilliancy.

- 2nd, Winnipeg, IV; Chicoutimi, IV; Pembina Crossing, IV.
 3rd, Father Point, IV; Novar, Bathurst, Winnipeg, IV; Chicoutimi, IV; St. Albans, IV; Pembina Crossing, IV.
 4th, Father Point, III; Novar, Truro, IV; Sydney, III; Winnipeg, III; Egremont, IV; Chicoutimi, IV; Peterborough, IV; Eau Clair, Pembina Crossing, IV.
 5th, Quebec, II; Truro, IV; Alexandria, III; Sydney, III; Winnipeg, IV; Haliburton, Bognor, IV; Egremont, IV; Pembina Crossing, II.
 6th, Winnipeg, IV; Chicoutimi, IV.
 7th, Little Forks, III; Chicoutimi, IV.
 12th, Chicoutimi, IV.
 14th, Little Forks, III.
 15th, Little Forks, III.
 16th, Chicoutimi, IV.
 17th, Little Forks, IV.
 18th, Chicoutimi, IV.
 25th, Little Forks, III; Pembina Crossing, III.
 27th, Pembina Crossing, III.
 29th, Pembina Crossing, IV.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF JUNE, 1891.

HOURS ENDING																
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON.	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMALT.....	..	0 10	0 15	0 19	0 34	0 53	0 54	0 64	0 59	0 65	0 62	0 65	0 62	0 52	0 27	0 00
WINNIPEG.....	0 17	33	46	40	48	45	50	50	52	62	62	55	58	51	36	09
.....
KINGSVILLE.....	..	15	53	63	65	69	76	70	73	66	57	59	61	51	37	..
WOODSTOCK.....	..	25	42	48	53	62	69	72	65	60	70	66	68	65	48	01
TORONTO.....	..	28	46	48	57	59	65	72	72	67	61	60	66	57	25	01
LINDSAY.....	15	43	51	59	63	60	69	68	65	63	71	67	64	61	59	05
BARRIE.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
KINGSTON.....	03	22	27	34	39	57	75	72	74	73	74	71	62	55	36	8.
.....
.....
CORNWALL.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
MONTREAL.....	05	30	45	57	66	67	72	75	76	69	68	65	62	31	05	00
FREDERICTON.....	01	18	27	37	44	46	45	62	53	53	51	47	39	31	22	09
SYDNEY.....	11	25	33	45	46	43	48	51	50	48	52	54	46	40	42	23
			ESQUIMALT.	WINNIPEG.		KINGSVILLE.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.			MONTREAL.	FREDERICTON.	SYDNEY.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)		0 38	0 45	..	0 53	0 53	0 52	0 58	..	0 50	..	..	0 58	0 37	0 42	
MAXIMUM DAILY AMOUNT.....		0 78	0 93	..	0 87	0 90	0 91	0 99	..	0 90	..	..	0 92	0 92	0 96	
DATE		9 25	19	..	13	23	14	10	..	29	..	..	13	20	14 18	
NO. OF DAYS COMPLETELY CLOUDED.....		4	1	..	3	2	3	3	..	4	..	..	1	8	6	

PROBABILITIES.

The probabilities issued by this office at 11 p. m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a. m.

The number of predictions issued during the month was 529. These were divided as follows :—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage Fully.
LOWER LAKE REGION	116	94	15	7	87 5
UPPER ST. LAWRENCE	108	89	7	12	85 6
LOWER ST. LAWRENCE.....	98	72	14	12	80 6
GULF.....	100	76	12	12	82 0
MARITIME PROVINCES	107	80	20	7	84 1
TOTAL	529	411	68	50	84 1

The percentage of verification is obtained by taking the sum of those fully verified and half the sum of those partly verified and dividing by the whole number.

In ascertaining the percentage of verification of the predictions the reports from the agents at the "Probability Stations," as well as the telegraphic reports, are used.

The daily probabilities and the storm warnings were issued by Probability Officer B. C. Webber.

STORM WARNINGS.

There were no storm warnings issued during the month, but in the Gulf of St. Lawrence during the 27th, 28th and 29th, a moderate to fresh N. E. gale was reported.

TORONTO OBSERVATORY—MAGNETIC REVIEW FOR 1891.

The magnets remained very steady until the night of the 2nd, when a small disturbance was observed, but passed off shortly afterwards. The following evening slight disturbing action again occurred, and was visible up to 6 a. m. of the 4th. A quiet period then ensued until 9 p. m. of the 5th; shortly after this hour a small disturbance set in, but only lasted for a short time. A marked easterly extreme was recorded at 10.10 p. m., after which a gradual recovery took place. At 2 a. m. of the 6th the magnet was quiet. On the nights of the 7th and 8th small disturbances were recorded. From the 9th to the 13th the magnets were remarkably steady, and was followed at 3.27 a. m. of the 14th by a disturbance which started rather suddenly, the declination magnet taking a sharp easterly deflection, followed immediately by a westerly swing. Attending the initial swing of the declination needle was an increase of both components of the force, the change being more marked on the bifilar. There were, however, no large departures from the normals, a rapid trembling of the three magnets being the chief character of the disturbance. At 5 p. m. the magnets came to rest and continued quiet for the following twenty-four hours. Early on the 16th slight disturbing action was felt and was visible often on up to the 27th; sharp little tremors were shown on the morning of the 24th, and on the 25th, 26th and 27th the curves were rather undulatory. From the 27th to the end of the month the magnets varied little from their normal values, there being a marked absence of disturbance. The diurnal declination curve on the last two days of the month was well marked.

On the 1st, 4th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 22nd, 24th, 25th, 26th, 27th, 28th and 29th, the sky was clear but no aurora was observed. On all other nights clouds or haze would have hidden any aurora which might have existed.

CHARLES CARPMAEL,

Director.

METEOROLOGICAL OFFICE,

TORONTO, July 5th, 1891.

PROPORTION OF BRIGHT ST

Monthly Weather Review.

JULY, 1891.

INTRODUCTION

In compiling the present Review the principal data made use of are the telegraphic reports of observations received at this office for the purpose of forecasting and the reports of storms received by mail. For the material used in tracing the progress of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

ATMOSPHERIC PRESSURE

The average pressure as determined from the observations taken at telegraph reporting stations, was everywhere about the normal of fourteen years. The excess was greatest in Manitoba and in Nova Scotia in each of which it amounted to about one tenth of an inch. In Ontario it was less than half this amount.

A general tendency to lower pressure characterized the early part of the month, there were a few showers in Ontario on the 1st but otherwise the weather was fair everywhere.

During the 3rd a cyclonic development of some importance took place over the Lakes, rain fell over the whole of Ontario to an excessive amount in some places rain inches falling at Saugeen. The wind increased to a gale from the West and N.W. in the Lake district.

By the 4th rain had extended far to the East in eastern Canada the cyclone being the night having moved eastward and being central just at the Ottawa valley. Fair weather followed over the Lakes, with strong N.W. winds. The cyclone raised local stormy weather over eastern Canada until the 7th, as it passed across the country and over the Gulf of St. Lawrence.

A small depression from the South West was the cause of showers over eastern Ontario on the 7th, and throughout eastern Canada next day. It passed over the Gulf of St. Lawrence on the 9th.

In the North-West the pressure changes during the first five days of the month were unimportant and the barometer was generally steady. In the 6th a fall of several inches took place in Manitoba in the 1st and in Saskatchewan and Alberta on the 3rd and 4th the weather elsewhere remained fair and pleasantly warm. On the 6th however an important anticyclone was accompanied by fair clear weather spread over the whole North-West. The weather elsewhere in the month was generally fair.

A slight depression in the North West was accompanied by showers in the 10th and 11th, followed by the 12th also a small depression in the 13th. The weather was generally fair and a slight daily increase in the temperature was noted. In the 14th a small depression was over the whole of eastern Canada, high temperatures being recorded in the 15th in Ontario and eastern Quebec.

In the North-West during the 14th after the passage of the anticyclone a small depression took place there the weather being generally fair and pleasant in the 15th and 16th.

On the 17th there was a depression over the North West, the weather was generally fair and pleasant accompanied by showers in the 18th and 19th.

On the 19th a small depression was over the North West, the weather was generally fair and pleasant. A depression had taken place in the 20th over the North West, the weather was generally fair and pleasant. In the 21st a depression was over the North West, the weather was generally fair and pleasant. In the 22nd a depression was over the North West, the weather was generally fair and pleasant. In the 23rd a depression was over the North West, the weather was generally fair and pleasant. In the 24th a depression was over the North West, the weather was generally fair and pleasant. In the 25th a depression was over the North West, the weather was generally fair and pleasant. In the 26th a depression was over the North West, the weather was generally fair and pleasant. In the 27th a depression was over the North West, the weather was generally fair and pleasant. In the 28th a depression was over the North West, the weather was generally fair and pleasant. In the 29th a depression was over the North West, the weather was generally fair and pleasant. In the 30th a depression was over the North West, the weather was generally fair and pleasant.

A slight and general depression was over the North West, the weather was generally fair and pleasant. In the 1st a depression was over the North West, the weather was generally fair and pleasant. In the 2nd a depression was over the North West, the weather was generally fair and pleasant. In the 3rd a depression was over the North West, the weather was generally fair and pleasant. In the 4th a depression was over the North West, the weather was generally fair and pleasant. In the 5th a depression was over the North West, the weather was generally fair and pleasant. In the 6th a depression was over the North West, the weather was generally fair and pleasant. In the 7th a depression was over the North West, the weather was generally fair and pleasant. In the 8th a depression was over the North West, the weather was generally fair and pleasant. In the 9th a depression was over the North West, the weather was generally fair and pleasant. In the 10th a depression was over the North West, the weather was generally fair and pleasant. In the 11th a depression was over the North West, the weather was generally fair and pleasant. In the 12th a depression was over the North West, the weather was generally fair and pleasant. In the 13th a depression was over the North West, the weather was generally fair and pleasant. In the 14th a depression was over the North West, the weather was generally fair and pleasant. In the 15th a depression was over the North West, the weather was generally fair and pleasant. In the 16th a depression was over the North West, the weather was generally fair and pleasant. In the 17th a depression was over the North West, the weather was generally fair and pleasant. In the 18th a depression was over the North West, the weather was generally fair and pleasant. In the 19th a depression was over the North West, the weather was generally fair and pleasant. In the 20th a depression was over the North West, the weather was generally fair and pleasant. In the 21st a depression was over the North West, the weather was generally fair and pleasant. In the 22nd a depression was over the North West, the weather was generally fair and pleasant. In the 23rd a depression was over the North West, the weather was generally fair and pleasant. In the 24th a depression was over the North West, the weather was generally fair and pleasant. In the 25th a depression was over the North West, the weather was generally fair and pleasant. In the 26th a depression was over the North West, the weather was generally fair and pleasant. In the 27th a depression was over the North West, the weather was generally fair and pleasant. In the 28th a depression was over the North West, the weather was generally fair and pleasant. In the 29th a depression was over the North West, the weather was generally fair and pleasant. In the 30th a depression was over the North West, the weather was generally fair and pleasant.

In the Northwest the fine anti-cyclonic period was terminated by an extended but shallow cyclone on the 15th, which brought a few local showers in Manitoba on the 15th and 16th, and in all the territories on the 15th. A short period of higher pressure followed, and on the 18th it became very warm in Alberta and part of Assiniboia with maxima of 86° and 88°. A decrease in pressure soon followed, and showery weather became general in Assiniboia and Alberta.

During the 20th a shallow but extended cyclone spread over the whole Northwest and continued there till the 22nd, the weather becoming generally showery and somewhat cooler. The winds then became westerly and northwesterly as an anti-cyclone appeared over the Rocky Mountain slope, and soon spread eastward, bringing cooler weather in Alberta and Assiniboia.

On the 23rd a slight depression from the Northwest passed over the Lakes, it caused a few local showers and fresh S. veering to N. W. winds. It was over the Gulf of St. Lawrence on the 25th, and had caused showery weather throughout Eastern Canada. Fair pleasant weather followed everywhere with the exception of a few local showers in the Upper St. Lawrence on the 26th and 28th and in the Maritime Provinces on the 26th and 27th. The general tendency was for moderate S. to S.W. winds, warmer weather and pressure varying slightly above and below normal, the lower pressure being more general to the north of the St. Lawrence river and Lower Lakes.

During the 29th the cyclonic area became more concentrated over the Lake district, showery weather and thunderstorms prevailed over Ontario during the night of the 29th and next day.

From the Lakes the cyclone moved eastward during the 31st, and was accompanied by fresh westerly winds and showery warm weather throughout eastern Canada, fairer weather having spread over Ontario during the 30th.

In the Northwest from the 22nd until the 27th generally anti-cyclonic conditions continued with fine moderately warm weather and light winds, except that the extreme temperature of 88° was experienced in Alberta on the 25th.

During the 27th the type became more cyclonic over the North-West, the weather for the most part being fair and warm, especially so in Alberta, a few local showers fell in Assiniboia on the 28th and 31st, and in Alberta on the 29th, 30th and 31st. There were also a few local showers in Manitoba on the 27th and 31st.

TEMPERATURE.

The average temperature, as determined from the observations taken at telegraph reporting stations, was below the average at nearly all stations. The defect was greatest in Ontario.

The highest and lowest temperatures in each Province during July were :

British Columbia, 96° on 23rd at Quamichan ; 33° on 7th, at Barkerville.

N. W. Territories, 90°·6 on 4th, at Medicine Hat ; 29° on 8th, at Glen Adelaide.

Manitoba, 88° on 30th, at St. Albans ; 32° on 4th, at Fort Ellice.

Ontario, 95° on 13th, at Guelph ; 26°·9 on 17th, at Sault St. Marie.

Quebec, 90° on 14th, at St. Hyacinthe ; 40° on 31st, at St. Hyacinthe, 40° on 22nd at Brome.

New Brunswick, 91°·5 on 12th, at Bathurst ; 41° on 23rd, at Dorchester.

Nova Scotia, 84° on 11th, at Pictou 41° on 23rd, at Truro.

P. E. Island, 85° on 11th, at Georgetown ; 41°·6 on 2nd, at Kilmahumaig.

STATIONS RECEIVED TOO LATE FOR JUNE REVIEW.

PROVINCE.	STATION.	MEAN TEMP.	HIGHEST TEMPERATURE.		LOWEST TEMPERATURE.		PRECIPITATION.		AURORAS.	THUNDER STORMS.
			Temp.	Date.	Temp.	Date.	Amount.	Days.		
		°	°		°		in.			
Manitoba.....	Dauphin.....	59.1	86.0	21	25.0	3	5.75	7		
Ontario	Wanstead	66.4	93.5	15	36.5	5	1.73	4		
	St. George.....	66.4	94.0	15	43.0	4	1.13	10		
	De Cewsville.....	64.8	90.0	25	34.0	9	0.65	6		
Nova Scotia	Sable Island.....	49.2	61.0	25	42.0	4.16	4.14	10		16.

PRECIPITATION.

The rainfall in part of Nova Scotia and Ontario has considerably exceeded the average. In the other Provinces it was below, the greatest defect occurring in P. E. Island.

The distribution is as follows :—

In BRITISH COLUMBIA, it was 1.05 in., or 0.26 in., below the average.

In the TERRITORIES it was 2.44 in., or 0.54 in., above July, 1890.

In MANITOBA it was 2.81 in., or 0.11 in. below the average.

In ONTARIO South and South-West district it was 3.17 in., or 0.29 in. above the average. In the North and North-West district it was 3.87 in., or 1.13 in. above the average. In the Central district it was 2.84 in., or 0.12 in. above the average, and in the East and North-East district it was 4.12 in., or 1.22 in. above the average.

In QUEBEC it was 3.82 in., or 0.40 in. below the average.

In NEW BRUNSWICK it was 3.80 in., or 0.11 in. below the average.

In NOVA SCOTIA it was 4.48 in., or 0.92 in. above the average.

In P. E. ISLAND it was 2.88 in., or 1.06 in. below the average.

Rainfall 5 in. and upwards during month :—

MANITOBA AND N.W.T. Edmonton, 6.63 in. ; Rathwell, 5.43 in. ONTARIO.—Orillia, 6.76 in. ; Ignace, 9.90 in. ; Little Forks, 10.00 in. ; Uplands, 5.45 in. ; Sprucedale, 5.80 in. ; Lucknow, 5.04 in. ; Denbigh, 5.31 in. ; Deseronto, 5.47 in. ; Kingston, 5.21 in. QUEBEC.—Quebec, 5.56 in. ; St. Hyacinthe, 6.62 in. N. BRUNSWICK.—Fredericton, 5.15 in. ; Chatham, 5.70 in. ; Parker's Ridge, 6.22 in. ; Bathurst, 7.41 in. NOVA SCOTIA.—Sydney, 6.92 in. ; White Head, 7.09 in.

Rainfall 1 in. and upwards in 24 hours.

1st, Ignace, 1.20 in. ; Ennismore, 1.07 in. ; Port Hope 1.32 in.

2nd, Zurich, 2.35 in.

3rd, Point Clark, 2.76 in. ; Nottawasaga Island, 1.05 in. ; Bognor, 1.05 in. ; Coldstream, 1.66 in. ; Orillia, 1.31 in. ; Lions Head, 2.25 in. ; Sunshine, 1.14 in. ; Aurora, 1.21 in. ; Watford, 1.00 in. ; Thedford 1.51 in. ; Owen Sound, 1.08 in. ; Haliburton, 1.05 in. ; Birnam 1.33 in. ; Goderich, 1.90 in. ; Presqu'Isle, 1.20 in. ; Sarnia, 1.38 in. ; St. Mary's 1.23 in. ; Gravenhurst, 1.08 in. ; Saugeen, 2.48 in. ; London, 1.13 in. ; Edmonton, 2.21 in. ; Little Current, 1.02 in. ; Ottawa, 1.47 in. ; Coldwater, 1.01 in.

4th, Lucknow, 1.48 in. ; Richmond, 1.20 in. ; Brome, 1.15 in. ; St. Hyacinthe, 1.00 in. ; Uplands, 1.13 in. ; N. Bruce, 1.75 in. ; Rockliffe, 1.13 in.

5th, Denbigh 1.13 in. ; Point Pelee, 1.27 in. ; Fort Simpson, 3.62 in. ; Port Moody, 1.65 in.

6th, Lyons 1.31 in. ; Fort Simpson, 2.44 in.

7th, Chatham, 1.07 in. ; Wanstead, 1.10 in. ; Wyoming, 1.20 in. ; Princeton, 1.28 in. ; Coldstream, 1.26 in. ; Watford, 1.25 in. ; St. Thomas, 1.22 in. ; Thedford, 1.15 in. ; Nelson 1.17 in. ; Wilton Grove, 1.40 in. ; Birnam, 1.22 in. ; Raleigh, 1.03 in. ; Brantford, 1.13 in. ; St. Mary's, 1.10 in. ; Kingsville, 1.08 in. ; Port Stanley, 1.02 in. ; Bermuda, 1.20 in. ; Fort Simpson, 1.75 in. ; London, 1.40 in.

8th, Digby, 1.00 in. ; Point Lepreaux, 1.23 in. ; St. George, 1.00 in. ; Niagara Falls, S. 1.01 in. ; Cow Bay, 1.42 in. ; Port Hastings, 1.50 in. ; Yarmouth, 1.08 in. ; Charlottetown, 1.33 in. ; Grand Manan, 1.17 in. ; Bathurst, 2.40 in. ; Sydney, 1.42 in. ; Halifax, 1.43 in.

9th, Sable Island, 1.30 in.

10th, Georgetown, 1.65 in. ; Port Hastings, 1.80 in. ; Stony Mountain, 1.30 in. ; Little Fork, 1.00 in.

11th, Maple Creek, 1.28 in.

- 12th, Gladstone, 1'60 in. ; Turtle Mountain, 2'45 in. ; Rathwell, 3'46 in. ; Oak Lake, 2'41 in. ; Morden, 2'31 in. ; Cartwright, 2'20 in. ; Hartney, 1'85 in. ; Elm Valley, 1'93 in. ; Hillview, 1'27 in. ; Foxton, 1'05 in. ; Greenwood, 1'37 in. ; Elkhorn, 1'43 in. ; Beaver Creek, 1'76 in. ; Kola, 1'73 in. ; DeClare, 1'03 in. ; Fort Ellice, 1'10 in. ; Hillview, 1'27 in. ; Ignace, 1'25 in. ; Maple Creek, 1'05 in. ; Port Arthur, 1'28 in. ; Swift Current, 1'20 in. ; Qu'Appelle, 1'17 in. ; Little Forks, 3'00 in. ; Savanne, 2'00 in. ; Virden, 1'20 in.
- 13th, Fort Ellice, 1'10 in. ; Roseberry, 2'20 in. ; Craigilea, 2'46 in. ; Carman, 1'62 in. ; Treherne, 1'49 in. ; Napinka, 3'36 in. ; Hanlan, 1'22 in. ; Gretna, 1'40 in. ; Morris, 1'06 in. ; Nottawasaga, Island, 1'10 in. ; Ignace, 1'95 in. ; Brandon, 1'00 in. ; Killarney, 1'46; Gladstone, 1'18 in. ; Burnside, 1'95 in. ; Portage la Prairie, 2'02 in. ; Glen Adelaide, 2'64 in. ; Savanne 1'05 in. ; Buda, 2'03 in. ; White River, 2'94 in. ; Gladstone, 1'18 in. ; Virden, 1'00 in.
- 14th, Norwood, 1'15 in. ; Egremont, 1'02 in. ; Dalhousie N. B., 1'10 in. ; Bognor, 1'52 in. ; Orillia, 1'03 in. ; Thompson, 1'18 in. ; Lyons, 1'04 in. ; Sombra, 1'01 in. ; Goderich, 1'22 in. ; Collingwood, 1.61 in. ; N. Bruce, 1'49 in. ; Bathurst, 1'70 in. ; Ottawa, 2'12 in. ; Coldwater, 1'67 in. ; Fredericton 1'32 in.
- 15th, Beatrice, 1'02 in. ; Brome, 1'82 in. ; St. George, 1'25 in. ; Point des Monts, 1'20 in. ; Paris, 1'15 in. ; Brantford, 1'15 in. ; Whiteside, 1'28 in. ; Bathurst, 1'00 in.
- 16th, Killarney, 1'18 in. ; Little Forks, 1'00 in.
- 17th, Glastonbury, 1'09 in.
- 18th, Ignace, 2'10 in. ; Kingston, 1'26 in. ; Ottawa, 1'00 in. ; Fort Simpson, 1'02 in.
- 19th, Ignace, 1'40 in. ; Point des Monts, 1'10 in. ; Anticosti, W. P. 1'13 in. ; Biequette 1'00 in. ; Bathurst, 1'10 in.
- 20th, Banff, 1'20 in.
- 22nd, Manitou, 1'01 in. ; Sault St. Marie, 1'80 in. ; Ignace, 1'15 in. ; White Head, N. S., 1'62 in. ; Little Forks, 1'40 in.
- 23rd, Egremont, 1'00 in. ; Willow Grove, 1'00 in.
- 24th, Scarboro Junction, 1'00 in. ; Quebec, 1'69 in. ; Ottawa, 1'08 in. ; Conestogo, 1'14 in.
- 25th, Chatham, N. B., 1.04 in. ; Fredericton, 1'25 in.
- 27th, Sydney 1'26 in.
- 28th, Stoney Creek, 1'03 in.
- 29th, Orillia, 1'16 in. ; Gravenhurst, 1'05 in.
- 30th, Shannonville, 1'18 in. ; Montreal 1'10 in.
- 31st, Ignace, 1'40 in. ; Dauphin, 1'00 in. ; Port Hastings, 1'50 in. ; Little Forks, 1'20 in.

Thunder Storms recorded at —

- 1st. Oak Bank, Posen, Egremont, Midland, Eau Claire, Gladstone, Alton, Whiteside, Conestogo, Coldwater.
- 2nd. Oak Bank, Sharon, Bognor, Georgetown, Renfrew, Gladstone, Georgina, Kingsville, Gravenhurst, Bancroft, Alton, Pelee Island, Peterborough, Rathwell, Durham, Lindsay, Coldwater.
- 3rd. Richmond, Brome, Sharon, Bognor, Burk's Falls, Lion's Head, Huntsville, Thedford, Clontarf, Cottam, Zurich, Lucknow, Kingsville, Gravenhurst, Uplands, Bancroft, Peterborough, Shannonville, Joly, Whiteside, Durham, Ottawa.
- 4th. Barkerville, Cottam, Lindsay, Virden.
- 5th. Sable Island, Parker's Ridge, Roseberry, Truro, Fredericton
- 6th. Sable Island, Roseberry, Conestogo.
- 7th. Bancroft, Pelee Island.
- 9th. Barkerville, Posen, Fort Ellice, Cotham, Hillview, Gladstone, Russell, Kola, Virden.
10. Posen, Fort Ellice, Cotham, Gladstone, Portage la Prairie, Treherne, Selkirk, Winnipeg.
- 11th. Buda.
12. Savanne, Thompson, Eau Claire, Georgina, Point Escuminac, Kilmahumag, Parker's Ridge, Roseberry, Selkirk, Fredericton.
13. Sprucedale, Axe Lake, Egremont, Sharon, Cook's Mills, Bognor, Savanne, Wiarton, Burk's Falls, Lion's Head, Eau Claire, Owen Sound, Georgina, Stoney Creek, Sombra, Haliburton, Kingsville, Gravenhurst, Uplands, Alton, Joly, Whiteside, Pembina Crossing, Durham, Coldwater.
- 14th. Sprucedale, Axe Lake, Richmond, Brome, Egremont, Sharon, Point Clark, Bognor, Wyoming, Wiarton, Princeton, Midland, Lion's Head, Georgetown, Cowal, St. Thomas, St. Mary's,

- Kingsville, Gravenhurst, Uplands, Bancroft, Alton, Pelee Island, Lindsay, Deseronto, Ottawa, London, Fredericton, Peterborough, Parker's Ridge, Dorchester, N.B., Collingwood, Joly, Whiteside, Durham, Thedford, Eau Claire, Nelson, Wilton Grove, Cartier, Clontarf, Owen Sound, Renfrew, Mattawa, Ridgetown, Zurich, Sombra, Haliburton, Birnam, Lucknow, Point Escuminac.
- 15th. Beatrice, Oak Bank, Brome, Fort Ellice, Cotham, Georgetown, Sunshine, Clontarf, Cottam, Gladstone, Portage la Prairie, Mattawa, Haliburton, St. Mary's, Russell, Savanne, Pembina Crossing, Rapid City, Deseronto.
- 16th. Oak Bank, Posen, Fort Ellice, Cotham, Sable Island, Russell, Roseberry, Treherne, Virden, Pembina Crossing.
- 17th. Egremont, Alton.
- 18th. Sprucedale, Egremont, Sharon, Burk's Falls, Georgetown, Eau Claire, Mattawa, Kingsville, Uplands, Joly, Rathwell.
- 19th. Barkerville, Agassiz, Hillview, Alexandria.
- 20th. Posen, Fort Ellice, Cotham, Gladstone, Kingsville, Russell, Pelee Island, Turtle Mountain, Pembina Crossing, Rapid City, Port Moody, Virden.
- 21st. Posen, Hillview, Gladstone, Portage la Prairie, Russell, Rathwell, Treherne, Kola, Little Forks, Winnipeg.
- 22nd. Cotham, Bognor, Burk's Falls, St. Thomas, Eau Claire, Owen Sound, Mattawa, Lucknow, Presqu'Isle, Gravenhurst, Uplands, Peterborough, Joly, Roseberry, Rathwell, Treherne.
- 23rd. Beatrice, Richmond, Egremont, Sharon, Wyoming, Princeton, Lion's Head, Cowal, St. Thomas, Thedford, Eau Claire, Clontarf, Cottam, Renfrew, Quamichan, Mattawa, Stoney Creek, Ridgetown, Zurich, Haliburton, Birnam, Presqu'Isle, St. Mary's, Kingsville, Gravenhurst, Deseronto, Ottawa, Alexandria, Little Forks, Bancroft, Pelee Island, Peterborough, Shannonville, Joly, Whiteside, Roseberry, Durham.
- 24th. Richmond, Oak Bank, Posen, Egremont, Elora, Agassiz, Clontarf, Cottam, Renfrew, Portage la Prairie, Quamichan, Mattawa, Ridgetown, Birnam, Kingsville, Bancroft, Parker's Ridge, Collingwood, Joly, Lindsay, Ottawa, Alexandria, Little Forks, Conestogo, Port Moody.
- 25th. Point Escuminac.
- 26th. Pelee Island.
- 27th. Cottam, Portage la Prairie, Kingsville, Treherne, Morden, Virden.
- 28th. Richmond, Posen, Bognor, Burk's Falls, Lion's Head, Georgetown, Nelson, Peterborough, Buda, Rathwell, Treherne, Pembina Crossing, Norquay, Virden.
- 29th. Beatrice, Richmond, Chatham, Elora, Sharon, Point Clark, Bognor, Wiarton, Nelson, Burk's Falls, Georgetown, Scarborough, Aurora, Acton, St. Thomas, Thedford, Eau Claire, St. Mary's, Kingsville, Gravenhurst, Bancroft, Alton, Pelee Island, Whiteside, Durham, Lindsay, Coldwater, Clontarf, Portage la Prairie, Zurich, Haliburton, Birnam, Paris, Lucknow, Uplands.
- 30th. Sprucedale, Beatrice, Posen, Egremont, Cotham, Scarboro, Cowal, Sable Island, Dauphin, Portage la Prairie, Ridgetown, Zurich, Kingsville, Russell, Gravenhurst, Virden, Bancroft, Battleford, Durham, Lindsay, Deseronto.
- 31st. Fort Ellice, Russell.

Aurora recorded at—

- 1st, Parker's Ridge, II; Quebec, II.
- 2nd, Little Current, IV.
- 3rd, Truro, IV.
- 4th, Dorchester, N.B.; Esquimalt, I.
- 5th, Esquimalt, III.
- 6th, Pembina Crossing, IV.
- 7th, Pembina Crossing, IV.
- 8th, Little Current, IV.
- 10th, Virden.
- 16th, Pembina Crossing, III.
- 25th, Pembina Crossing, II; Coldwater, IV.
- 26th, Pembina Crossing, III; Alton, II; Yarmouth, IV; Little Forks, III; Coldwater, II; Fredericton, IV.

The number of predictions issued during the month was 499. These were divided as follows :—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
LOWER LAKE REGION.....	111	94	10	7	89.2
UPPER ST. LAWRENCE.....	101	78	18	5	86.1
LOWER ST. LAWRENCE.....	96	79	11	6	88.0
GULF.....	91	72	12	7	85.7
MARITIME PROVINCES.....	100	74	16	10	82.0
TOTAL.....	499	397	67	35	86.3

The percentage of verification is obtained by taking the sum of those fully verified and half the sum of those partly verified and dividing by the whole number.

In ascertaining the percentage of verification of the predictions the reports from the agents at the "Probability Stations," as well as the telegraphic reports, are used.

The daily probabilities were issued by Probability Officer H. V. Payne.

STORM WARNINGS.

No storm warnings were issued during the month of July.

TORONTO OBSERVATORY—MAGNETIC REVIEW FOR JULY, 1891.

A slight disturbance prevailed on the 1st, the following day was much quieter. The diurnal curve on both days was well marked; also on the morning of the 3rd. During the afternoon of this day the magnets became unsteady, and a moderate disturbance was registered between 6.20 and 9 p.m. At 7.10 the declination magnet moved gradually east, pausing several times. After reaching its extreme it vibrated for about ten minutes, when a quick westerly rise took place, the extreme taking place during the cut off of the light, viz., between 8 and 8.02 p.m. At the turn on of the light the magnet was on an easterly swing of 35'; the extreme easterly was reached at 8.12 p.m., the magnet then slowly regained its normal reading, and by 10 p.m. was quiet. During this disturbance the vertical force changed considerably. From 1 to 7.25 p.m. a steady increase of this component was shown, its maximum value was reached about the time that the declination magnet commenced to feel the disturbance, and its minimum a little after 7.58 p.m. The horizontal force curve was very wavy all afternoon and evening; its maximum occurred at 8.03 p.m. A quiet period followed, lasting nearly two days. A little before 10 p.m. of the 5th, a slight disturbance sprang up and continued to the afternoon of the 7th; it was more active during the afternoon and night of the 6th.

From the 6th to the 16th the magnets were generally quiet; on the afternoon of the 16th a slight disturbance appeared and continued up to the 17th; it was more active on the morning of the 17th. The movements of the declination needle were undulatory. A noticeable increase of the v.f. component was shown between 6 a.m. and noon, and of the horizontal between 10 a.m. and noon. This disturbance was followed by a quiet period, lasting to the 23rd. On the 24th slight disturbing action set in after 4 a.m., and continued up to 2 a.m. of the 25th. From the 25th to the end of the month the magnets were free from disturbance, with the exception of a slight irregularity between 8 and 11 p.m. of the 27th.

There were no auroras observed during the month. On the 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 16th, 17th, 18th, 20th, 21st, 22nd, 24th, 25th, 26th, 27th, 28th, 29th, 30th and 31st the sky was clear but no aurora was observed. On all other nights clouds or haze would have hidden any aurora which might have existed.

CHARLES CARPMAEL,

Director.

METEOROLOGICAL OFFICE,

TORONTO, 9th September, 1891.

METEOROLOGICAL SERVICE, DOMINION OF CANADA.

Monthly Weather Review.

AUGUST, 1891.

INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraphic reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

ATMOSPHERIC PRESSURE.

The average pressure, as determined from the observations taken at telegraph reporting stations, was slightly below the normal of seventeen years in Ontario and the western portion of Quebec; elsewhere it was above the normal.

On the 1st the pressure was about average and the weather fine in the North-West Territories and lower pressure with local showers and thunder storms prevailed from the Lake Region eastward. During the 2nd and 3rd the pressure was decreasing slowly in the North-West and steadily but slowly increasing in other parts of Canada with very fine weather everywhere. For the next three days anti-cyclonic conditions and a continuance of fine pleasant weather prevailed from the Lake Region eastward, while cyclonic conditions and very warm weather, with local showers and thunder storms, prevailed in the North-West Territories, the temperature at many points being upwards of 92°.

On the 7th the pressure was about normal in the Lake Region, with intensely warm weather, while a cyclonic movement was taking place southward across the Gulf of St. Lawrence, giving rain during the early part of the day in the Lower St. Lawrence and at night and early part of the next day in the Maritime Provinces. At the same time the cyclonic conditions over the North-West Territories were gradually working eastward and on Sunday, the 9th, while the centre was moving north of the Lakes, very heavy local thunder storms, with severe squalls, were prevalent over the greater part of Ontario; further east it gave some local showers on the 10th. A somewhat less marked cyclonic movement followed this last, giving showers generally in the North-West Territories on the 9th, local showers in Ontario and Quebec on the 11th and showers and heavy thunder storms in the Maritime Provinces on the 12th. After this showery weather, about average pressure, and fine weather prevailed for a few days in all parts of the country.

A few small and comparatively unimportant barometric depressions caused local showers in different parts of Canada between the 13th and 19th but the weather was generally fair. The charts of the 18th and 19th showed cyclonic conditions becoming pronounced over our North West Territories but the weather continued fine and warm. During the night of the 19th these conditions were transferred eastward from Manitoba and indications of an approaching anti-cyclone appeared in Alberta. From Lake Superior the depression moved quickly to the Gulf of St. Lawrence with increasing energy, causing showers and thunder storms during the night of the 20th and the morning of the 21st in the Lake Region and a fresh south westerly blow, with showery weather in the Gulf. A subsidiary depression which formed over the Upper Lakes, caused a few more local showers on the 21st in the Lake Region and then at night coalesced with the former depression yet hovering over the Gulf, after which the combined system dispersed; heavy local rains occurred in the Maritime Provinces on the 22nd. The high pressure behind these depressions proved decidedly important, and as it spread over the North West brought cooler weather, and slight frosts occurred at points in Manitoba during the early morning of the 22nd.

A small depression developed over the Ohio Valley during the 22nd and for two days hovered to the south of Lakes Erie and Ontario and gave rain in Southern Ontario on the 23rd. On the 24th the centre moved northward to the Georgian Bay and thence eastward, giving a pretty general rain all day in the Province of Ontario, and afterwards some showers along the St. Lawrence.

For the next two days anti-cyclonic conditions were mostly prevalent and the weather generally fair with temperature above average in the Maritime Provinces, about average in Ontario and below in Manitoba and the North-West Territories. Frosts occurred in Manitoba during the early morning of the 27th.

On the 27th there was a rapid cyclonic development over the Lower Lake Region and at night, as the centre moved northeastward to the Ottawa Valley, there was a considerable rainfall over the Province of Ontario which, on the 28th, was followed by a moderate westerly gale. As the disturbance moved eastward the weather was showery during the day along the St. Lawrence and that night and early next day in the Maritime Provinces.

A depression which appeared in the North-West on the 27th, with fine, warm weather, was moving southeastward from Manitoba during the night of the 28th. From Lake Superior it moved with diminishing energy to Southern Michigan and Indiana, while anti-cyclonic conditions became more pronounced over and to the east and north of the lakes. By the 31st the depression had almost disappeared and gave only a few local showers in southern Ontario, and the month closed with fair and comparatively cool weather general from Lake Superior to Nova Scotia, and low pressure with fine decidedly warm weather in the North-West Territories.

TEMPERATURE.

The average temperature, as determined from the observations taken at telegraph reporting stations, was below the normal of seventeen years at nearly all stations except those in Nova Scotia and Prince Edward Island. The greatest excess was at Yarmouth, N. S., $1^{\circ}7$, and the greatest defect at Rockliffe, Ont., $2^{\circ}1$.

The highest and lowest temperatures in each Province during August were:

British Columbia, $92^{\circ}0$ on 25th and 29th at Agassiz ; $33^{\circ}0$ on 19th, at Donald.

N. W. Territories, $92^{\circ}8$ on 29th, at Medicine Hat ; $29^{\circ}9$ on 19th, at Banff.

Manitoba, $96^{\circ}5$ on 5th, at Oak Bank ; $96^{\circ}5$ on 6th, at St. Albans ; $13^{\circ}0$ on 27th, at Fort Ellice.

Ontario, $99^{\circ}0$ on 5th, at Buda ; $99^{\circ}0$ on 9th, at Cottam ; $25^{\circ}0$ on 28th, at Savanne.

Quebec, $90^{\circ}2$ on 11th, at Montreal ; $32^{\circ}0$ on 20th, at Brome.

New Brunswick, $90^{\circ}0$ on 3rd, at Bathurst ; $39^{\circ}0$ on 13th, at Dalhousie ; $39^{\circ}0$ on 20th, at Parker's Ridge.

Nova Scotia, $90^{\circ}0$ on 24th, at Truro ; $40^{\circ}0$ on 20th, at Truro.

P. E. Island, $88^{\circ}5$ on 25th, at Georgetown ; $42^{\circ}7$ on 20th, at Kilmahumaig.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, AUGUST, 1891.

[illegible]

STATIONS RECEIVED TOO LATE FOR JULY REVIEW.

PROVINCE.	STATION.	HIGHEST TEMPERATURE.			LOWEST TEMPERATURE.		PRECIPITATION.		AUROEAS.	THUNDER STORMS.
		MEAN TEMP.	Temp.	Date.	Temp.	Date.	Amount.	Days.		
		°	°		°		in.			
British Columbia . . .	Donald	62.76	95.0	21	32.0	7	0.79	11		
N. W. Territories	Regina	62.70	83.5	3	40.0	11	1.20	8		15, 23, 28.
Manitoba	Channel Island	62.27	82.0	15	40.0	23	0.08	2	11, 20.	1, 10, 21, 23, 29, 30.
Ontario	Woodstock	65.66	89.0	7-9	39.0	29	1.75	14		

PRECIPITATION.

The rainfall, except in Nova Scotia, P. E. Island and Manitoba, has considerably exceeded the average in some of the northern parts of Ontario; the amount has been what may be described as excessive.

The distribution is as follows:—

In BRITISH COLUMBIA, it was 2.03 in., or 0.05 in., above the average.

In the TERRITORIES it was 1.91 in., or 0.08 in., below 1890.

In MANITOBA it was 2.53 in., or 0.08 in., below the average.

In ONTARIO West and South-West district it was 3.78 in., or 1.24 in. above the average. In the North and North-West district it was 4.18 in., or 2.04 in. above the average. In the Central district it was 4.14 in., or 2.10 in. above the average, and in the East and North-East district it was 3.64 in., or 1.54 in. above the average.

In QUEBEC it was 3.52 in., or 0.34 in. above the average.

In NEW BRUNSWICK it was 4.38 in., or 0.79 in. above the average.

In NOVA SCOTIA it was 2.55 in., or 1.36 in. below the average.

In P. E. ISLAND it was 2.39 in., or 1.10 in. below the average.

Rainfall 5 in. and upwards during month:—

MANITOBA.—Morden, 5.90 in.

ONTARIO. Owen Sound, 7.05 in.; Uplands, 5.21 in.; North Bruce, 5.00 in.; London, 5.41 in.; Elora, 5.12 in.; Sombra, 5.60 in.; Stoney Creek, 6.11 in.; Deseronto, 5.92 in.; Eau Claire, 5.53 in.; Presque Isle, 6.90 in.; Midland, 7.38 in.; Lion's Head, 11.05 in.; Wiarton, 8.21 in.; Watford, 5.46 in.; Acton, 6.02 in.

QUEBEC. — Montreal, 5.05 in.; Brome, 6.32 in.

NEW BRUNSWICK. — Chatham, 5.76 in.; St. John, 5.41 in.; Parker's Ridge, 6.85 in.

BERMUDA. — 12.53 in.

Rainfall 1 inch and upwards in 24 hours:

1st, St. John, N. F. L., 2.68 in.

5th, Oak Bank, 1.06 in.; Abbotsford, 1.40 in.; Portage la Prairie, 1.21 in.; Winnipeg, 1.54 in.

6th, Brandon, 1.40 in.; Agassiz, 2.24 in.; Portage la Prairie, 1.25 in.; Savanne 1.60 in.; Cotham, 1.07 in.; Morden, 5.62 in.; Cartwright, 2.36 in. in 2 hours; Gladstone, 2.15 in.; Cartwright (2), 1.00 in.; Selkirk, 2.30 in.; Manitou, 1.05 in.; Swift Current, 1.44 in.; Qu'Appelle, 1.05 in.

7th, Digby, 1.40 in.; Oak Bank, 1.56 in.; Killarney, 2.55 in.; Brandon, 1.75 in.; Hillview, 1.00 in.; Elkhorn, 1.12 in.; Russell, 1.26 in.; Rapid City, 2.00 in.; St. Albans, 2.53 in.; Hanlan, 3.60 in.; Rosebury, 2.40 in.; Beaver Creek, 1.25 in.; Cartwright, 2.10 in.; Pembina Crossing, 3.55 in.; Gorman, 2.43 in.; Dominion City, 1.75 in.; Craigilea, 1.03 in.; Gretna, 2.33 in.; Claudeboye, 1.90 in.; Burnside, 1.30 in.; Greenwood, 1.64 in.; Hartney, 1.50 in.; Deseronto, 1.38 in.; Winnipeg, 1.82 in.; Qu'Appelle, 1.02 in.

8th, Cook's Mills, 1.40 in.; Sault Ste. Marie, 1.24 in.; Point Escuminac, 1.14 in.; Point Clark, 1.10 in.; Gladstone, 1.50 in.; Lion's Head, 1.23 in.; Foxton, 1.02 in.; Truro, 1.10 in.; Durham, 1.70 in.

9th, Elora, 3.14 in.; Egremont, 2.42 in.; Stoney Creek, 1.55 in.; Point Clark, 1.17 in.; Bognor, 1.92 in.; N. Bruce, 1.71 in.; Sombra, 1.85 in.; Owen Sound, 3.82 in.; Cayuga, 1.12 in.; Rose Hill, 2.24 in.; Thompson, 1.21 in.; Scarboro, 1.91 in.; Acton, 3.81 in.; Thedford, 1.08 in.; Watford, 2.10 in.; Georgetown, 2.47 in.; Lion's Head, 2.37 in.; Wiarton, 3.91 in.; Midland, 2.01 in.; Presque Isle, 3.02 in.; Wilton Grove, 1.18 in.; Orangeville, 2.40 in.; Aurora, 1.92 in.; Sarnia, 1.64 in.;

- Conestogo, 212 in.; Coldwater, 137 in.; Durham, 110 in.; Saugeen, 115 in.; Parry Sound, 124 in.; Nelson, 147 in.
- 10th, N. Bruce, 110 in.; Sharon, 136 in.; DeCewsville, 118 in.; Niagara Falls S., 210 in.; Cape Chatte, 131 in.; St. Mary's, 269 in.; Lucknow, 101 in.; Birnam, 100 in.; Paris, 131 in.; Heron Bay, 300 in.; St. George, 183 in.; Credit, 229 in.; Coldstream, 226 in.; Wyoming, 137 in.; London, 185 in.
- 11th, Renfrew, 122 in. (in one hour).
- 12th, Chatham, N. B., 105 in.
- 14th, Clontarf, 170 in.; Cowal, 108 in.; Watford, 105 in.; Wilton Grove, 135 in.
- 15th, Novar, 124 in.
- 16th, Halifax, 131 in.
- 17th, Agassiz, 127 in.; Lion's Head, 190 in.; Wiarton, 152 in.; Presque Isle, 125 in.; Eau Claire, 120 in.; Clandeboye, 105 in.
- 18th, Brome, 118 in.; Montreal, 103 in.
- 19th, Quamichan, 103 in.; St. Hyacinthe, 115 in.
- 20th, Paris, 202 in.; Cowal, 158 in.; Glastonbury, 150 in.; Watford, 120 in.; Raleigh, 100 in.; Wyoming, 100 in.; Sarnia, 105 in.; Petrolea, 105 in.; London, 150 in.; Bermuda, 222 in.; Parry Sound, 108 in.
- 21st, Chicoutimi, 115 in.; Beatrice, 107 in.; Stoney Creek, 148 in.; St. Hyacinthe, 287 in.; Lucknow, 115 in.; Sombra, 124 in.; Birnam, 145 in.; Parker's Ridge, 220 in.; Princeton, 132 in.; Thedford, 157 in.; St. Thomas, 125 in.; Heron Bay, 250 in.; St. George, 170 in.; Lyons, 111 in.; Richmond, 120 in.; Woodstock, 103 in.; Petrolea, 100 in.; Deseronto, 160 in.; Quebec, 128 in.; Bermuda, 451 in.; Montreal, 120 in.; Nelson, 160 in.
- 22nd, Point Lepreaux, 120 in.; Point Escuminac, 133 in.; St. Andrew, 129 in.; Chatham, N. B., 128 in.
- 23rd, Denbigh, 133 in.; Lindsay, 107 in.
- 24th, Stoney Creek, 129 in.; Uplands, 131 in.; Alexandria, 221 in.; Kingston, 170 in.
- 25th, Heron Bay, 200 in.
- 27th, Point Lepreaux, 175 in.; Lion's Head, 148 in.; Wiarton, 148 in.; Eau Claire, 108 in.; Joly, 137 in.; Grand Manan, 117 in.; Bermuda, 338 in.
- 28th, Mattawa, 124 in.; Kilmahumaig, 11 in.; Glastonbury, 190 in.; Uplands, 127 in.; Eau Claire, 120 in.
- 29th, Lion's Head, 266 in.
- 30th, Kingsville, 142 in.; Midland, 158 in.

Thunder recorded on—

- 1st, Richmond, Cotham, Portage la Prairie, St. Hyacinthe.
- 2nd, Norquay, Treherne, St. Albans, Russell, Portage la Prairie, Gladstone, Posen, Channel Island, Novar, Fort Ellice.
- 3rd, Roseberry, Hillview, St. Albans, Rapid City, Portage la Prairie, Gladstone, Posen, Gravenhurst, Oak Bank, Novar.
- 4th, Selkirk, Barkerville, Cotham, Savanne, Portage la Prairie, Pelee Island, Posen, Oak Bank, Channel Island, Winnipeg.
- 5th, Roseberry, Norquay, Hillview, Treherne, Dominion City, Cotham, Savanne, St. Albans, Rapid City, Russell, Manitou, Portage la Prairie, Pelee Island, Gladstone, Winnipeg, Posen, Oak Bank, Swift Current.
- 6th, Cartwright (very severe), Norquay (terrific), Treherne, Selkirk, Rathwell, Oak Lake, Cotham, Joly, Savanne, Russell, Pembina Crossing, St. Albans, Rapid City, Portage la Prairie, Parker's Ridge, Pelee Island, Gladstone, Stony Creek, Posen, Fort Ellice, Fredericton, Swift Current, Winnipeg.
- 7th, Hanlan, Roseberry (fearful storm), Hillview, Treherne, Dominion City, Rathwell, Barkerville, Richmond, Joly, Russell, Parker's Ridge, Portage la Prairie, Gladstone, Buda, St. Hyacinthe, Brome, Oak Bank, Channel Island, Digby, Beatrice, Chicoutimi, Stony Mountain, Ottawa, Alexandria, Deseronto, Swift Current, Winnipeg.
- 8th, Joly, Whiteside, Aurora, Toronto, Presque Isle, Wiarton, Lion's Head, Burl's Falls, Cayuga, Sprucedale, Portage la Prairie, Haliburton, Bognor, Point Clark, Posen, Egremont, Channel Island, Peterborough, Thuro, Durham.

- 9th, Whiteside, Aurora, Toronto, Wyoming, Coldstream, Wilton Grove, Presqu'Isle, Midland, Wiarton, Lion's Head (dreadful storm), Georgetown, St. Thomas, Thedford, Burk's Falls, Lindsay, Denham, London, Acton, Scarborough, Princeton, Cowal, Drayton, Cayuga, Georgina, Sprucedale, Sombra, Lucknow, St. Mary's, Sharon, Bognor, Point Clark, Sunshine, Stony Creek, Kingsville, Owen Sound, Paris, Zurich, Portage la Prairie, Haliburton, Birnam, Posen, Egremont, Beatrice, Elora, Peterborough, Conestogo, Coldwater, Petrolea.
- 10th, Wyoming, Savanne, Georgetown, Portage la Prairie, St. Mary's, Buda, Bognor, Killarney, Stony Creek, Chicoutimi, London.
- 11th, Richmond, Joly, Whiteside, Eau Claire, Toronto, Wyoming, Denbigh, Georgetown, Thedford, Princeton, Ennismore, Cowal, Kingsville, Paris, Portage la Prairie, Renfrew, Haliburton, Sombra, Ridgetown, Brome, Beatrice, Peterborough, Chicoutimi, Ottawa, Alexandria, Nelson.
- 12th, Parker's Ridge, Portage la Prairie, Dorchester, N. B., Kilmahumaig, Ignace, Brome, Point Escuminac, Point Lepreaux, Digby, Novar, Pictou, Bathurst.
- 13th, Eau Claire, Mattawa, St. Hyacinthe, Gravenhurst, Novar, Ottawa.
- 14th, Joly, Whiteside, Wiarton, Thedford, Burk's Falls, Cowal, Sprucedale, Kingsville, Zurich, Haliburton, Birnam, Sombra, St. Mary's, Bognor, Beatrice, Novar, Chicoutimi, Alexandria, Swift Current.
- 15th, Lion's Head, Russell, Sunshine, Swift Current.
- 16th, Fort Ellice, Norquay, Selkirk, Richmond, Cotham, Rapid City, Portage la Prairie, Posen, Pictou, Fort Ellice, Truro, Alexandria.
- 17th, Hankan, Treherne, Selkirk, Clandeboye, Joly, Whiteside, Eau Claire, Uplands, Presque Isle, Wiarton, Lion's Head, Burk's Falls, Rapid City, Kingsville, Portage la Prairie, Dorchester, N.B., Kilmahumaig, Posen, Oak Bank, Pictou, Coldwater, Truro, Winnipeg.
- 18th, Cotham, Sprucedale, Portage la Prairie, Bognor, Brome, Posen, Oak Bank, Chicoutimi, Lindsay, Alexandria.
- 19th, Clandeboye, Owen Sound, Pelee Island, Birnam, Sombra, Fort Ellice.
- 20th, Joly, Whiteside, Eau Claire, Wyoming, Presque Isle, Wiarton, Thedford, Burk's Falls, Cowal, Sprucedale, Kingsville, Paris, Zurich, Pelee Island, Birnam, Sombra, Ridgetown, Lucknow, Bognor, Point Clark, Egremont, Beatrice, Petrolea, Durham, Deseronto.
- 21st, Eau Claire, Toronto, Georgetown, Scarborough, Cayuga, Kingsville, Pelee Island, Sombra, Sharon, Brome, Chicoutimi, Conestogo, Durham, Nelson.
- 22nd, Cotham, Lion's Head.
- 23rd, Cotham, Russell, Novar.
- 24th, Treherne, Wyoming, Georgetown, Zurich, St. Hyacinthe, Posen, Egremont.
- 25th, Truro.
- 27th, Toronto, Sombra, Oak Bank.
- 28th, Pembina Crossing, Treherne, Selkirk, Richmond, Sharon, Brome, Alexandria, Deseronto, Winnipeg.
- 29th, Pelee Island, Novar.
- 30th, Scarborough, Cowal, Kingsville, Owen Sound, Zurich, Birnam, Sombra, Ridgetown, Lucknow, Point Clark, Novar, Petrolea.
- 31st, Roseberry, Hillview, Pembina Crossing, Selkirk, Cotham, Toronto, Georgetown, St. Thomas, Ennismore, Cowal, Rapid City, Cayuga, Russell, Birnam, Ridgetown, Gladstone, Lucknow, Elkhorn, St. Mary's, Point Clark, Posen, Egremont, Gravenhurst, Peterborough, Fort Ellice, Cottam, Coldwater, Durham.

Aurora recorded on

- 1st, Coldwater, I.
- 2nd, Peterborough, IV ; Cook's Mills, Posen, III ; Russell, I ; Savanne, Cotham, IV ; Prince Albert, IV ; Winnipeg.
- 3rd, Chicoutimi, IV ; Cook's Mills, Channel Island, III ; Gravenhurst, II ; Buda, Pembina Crossing, II ; Dorchester, N.B., Pembina Crossing, II ; Truro, IV ; Alexandria, III ; Port Arthur, III ; Winnipeg.
- 4th, Posen, IV ; Sydney, III ; Port Arthur, I ; Winnipeg.
- 5th, Dorchester, N.B.
- 7th, Channel Island, IV ; Hillview, Elkhorn, Alexandria, III ; Winnipeg.

- 8th. Pembina Crossing, IV.
- 9th. Oak Bank, IV ; Posen, II ; Hillview, Dorchester, N.B., Pembina Crossing, IV ; Winnipeg.
- 10th. Oak Bank, IV ; Hillview, Elkhorn, Russell, II ; Pembina Crossing, I ; Alexandria, III ; Father Point, III ; Winnipeg.
- 11th. Haliburton, Pembina Crossing, II.
- 12th. Channel Island, IV ; Hillview, Pembina Crossing, III ; Prince Albert, IV ; Winnipeg.
- 13th. Gravenhurst, IV ; Posen, I ; Elkhorn, Russell, IV ; Pembina Crossing, III ; Prince Albert, III ; Winnipeg.
- 14th. Channel Island, III ; St. Albans, IV ; Savanna, Pembina Crossing, III ; Prince Albert, III ; Winnipeg.
- 15th. Elkhorn, Cotham.
- 16th. Oak Bank, IV.
- 21st. Hillview, Russell, IV ; Russell III ; Winnipeg.
- 22nd. Fort Ellice, II ; Winnipeg.
- 26th. Novar, IV ; Cape Chatte, Coldwater, I ; Father Point, III.
- 27th. Russell, III ; Medicine Hat, III ; Edmonton, III.
- 28th. Portage la Prairie, Kingsville, I ; Georgina, Rapid City, Russell, II ; St. Albans, II ; Elora, Channel Island, III ; Oak Bank, IV ; Egremont, IV ; Posen, I ; Stoney Creek, II ; Point Clark, II ; Cartier, I ; Bognor, II ; Sharon, IV ; Elkhorn, Ridgetown, Sombra, II ; Pelee Island.
- 29th. Peterborough, II ; Channel Island, III ; Gravenhurst, III ; Brandon, I ; Posen, II ; Hillview, Sharon, III ; Buda, Gladstone, Birnam, IV ; Portage la Prairie, I.
- 30th. Chicoutimi, IV ; Fort Ellice, II ; Oak Bank, I ; Gravenhurst, IV ; Posen, I ; Hillview, Russell, I ; St. Albans, III ; Cotham, IV ; Pembina Crossing, II ; Father Point, III ; Qu'Appelle, I ; Winnipeg.
- 31st. Chicoutimi, IV ; Elkhorn, Savanna (very brilliant), Eau Claire, Pembina Crossing, III ; Alexandria, III ; Father Point, IV ; Qu'Appelle, II ; Port Arthur, I.
- 28th. Huntsville, Georgetown, IV ; Cotham, II ; Cartwright, Pembina Crossing, II ; Galt, Winnipeg, Truro, III ; Durham, II ; Swift Current, I ; Saugeen, IV ; Prince Albert, III ; Qu'Appelle, Kingston, III.
- 29th. Huntsville, Georgetown, III ; Eau Claire, Cotham, I ; Cartwright, Pembina Crossing, I ; Qu'Appelle, Winnipeg.
Coldwater, IV ; Truro, IV ; Lindsay, IV ; Alexandria, II ; Swift Current, I ; Edmonton, III.
Frost recorded on—
- 6th. Digby.
- 19th. Banff (30°).
- 21st. Shoal Lake (29°), Craigilea, Barclay.
- 22nd. Fort Ellice (31°), Norquay, Hillview (ice), Cartwright, Pembina Crossing, Treherne, Craigilea, Banff (31°) ; Barclay, Russell (28°) ; Killarney, Stoney Mountain.
- 23rd. Norquay, Dominion City (29°), Oak Bank (29°), Barclay, Killarney.
- 25th. Roseberry, Cartwright (ice), St. Albans.
- 26th. Cartwright, Fort Ellice, Norquay, Pembina Crossing, Craigilea, Selkirk (29°), Clandeboye, Banff (31°), St. Albans, Russell (31°), Portage la Prairie, Gladstone, Buda, Killarney.
- 27th. Hanlan, Morden (ice), Fort Ellice (ice 12-in. thick), Hillview, Cartwright, Shoal Lake (25°), Treherne (25°), Dominion City (27°), Craigilea, Oak Bank (31°), Rathwell (29°), Gladstone (30°), Posen (30°), Russell (26°), Portage la Prairie (29°), Glen Adelaide, Buda, Killarney, Winnipeg (30°).
- 28th. Roseberry, Sarnia, Georgina, Buda.
- 29th. Beatrice, Gravenhurst, Uplands (ice), Burk's Falls, Scarborough, Thompson, Sprucedale, Bognor, Peterborough.
- 30th. Treherne (29°), Sprucedale, Portage la Prairie, Gladstone (31°).

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE
THE HORIZON IN THE MONTH OF AUGUST, 1891.

HOURS ENDING																	
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.	
ESQUIMAULT		0 05	0 49	0 61	0 67	0 73	0 74	0 77	0 76	0 81	0 78	0 78	0 75	0 59	0 07	..	
INDIAN HEAD		0 05	0 30	0 50	0 60	0 70	0 67	0 63	0 58	0 65	0 64	0 59	0 63	0 51	0 24	..	
WINNIPEG	S.	0 30	0 56	0 70	0 67	0 70	0 69	0 71	0 79	0 81	0 79	0 65	0 60	0 62	0 29	..	
KINGSVILLE		0 03	0 44	0 66	0 78	0 74	0 68	0 67	0 77	0 74	0 76	0 73	0 57	0 16	0 00	..	
WOODSTOCK		0 08	0 35	0 55	0 67	0 65	0 71	0 66	0 66	0 55	0 63	0 66	0 63	0 31	0 06	..	
TORONTO		0 05	0 15	0 56	0 66	0 66	0 67	0 70	0 66	0 58	0 53	0 51	0 50	0 52	0 19	..	
LINDSAY		0 12	0 39	0 61	0 63	0 63	0 65	0 62	0 61	0 59	0 51	0 49	0 39	0 27	0 00	S.	
BARRIE		0 11	0 42	0 55	0 53	0 56	0 54	0 58	0 51	0 55	0 55	0 60	0 55	0 59	0 21	..	
KINGSTON	N.	0 25	0 51	0 58	0 60	0 62	0 67	0 67	0 69	0 65	0 65	0 59	0 53	0 33	0 15	..	
.....		
.....		
.....		
MONTREAL		0 13	0 40	0 56	0 62	0 60	0 65	0 71	0 70	0 72	0 70	0 66	0 56	0 26	..	..
FREDERICTON		0 14	0 33	0 41	0 51	0 56	0 63	0 61	0 62	0 58	0 56	0 57	0 53	0 43	0 26	..	
SYDNEY		0 19	0 41	0 46	0 58	0 66	0 68	0 69	0 58	0 61	0 55	0 55	0 53	0 47	0 20	0 02	
			ESQUIMAULT.	INDIAN HEAD.	WINNIPEG.	KINGSVILLE.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.				MONTREAL.	FREDERICTON.	SYDNEY.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)		0 60	0 50	0 62	0 55	0 51	0 51	0 45	0 47	0 53	..	..	..	0 58	0 48	0 51	
MAXIMUM DAILY AMOUNT		0 86	0 87	0 93	0 85	0 86	0 89	0 90	0 91	1 00	..	..	..	0 98	0 97	0 98	
DATE		27	30	14	25	25	25	19	19	18	..	..	..	19	19	5	
NO. OF DAYS COMPLETELY CLOUDED		3	0	0	1	1	1	2	1	3	..	..	..	1	3	0	

STORM WARNINGS.

During the month warnings on the approach of one storm were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 41, of which 14, or 34·1 per cent., were verified. At one station, however, the force exceeded that indicated by the signal displayed; three stations reported warnings received late, owing to delay, and two stations reported a storm for which no warning was sent.

In connection with the warnings, predictions as to probable direction of the winds were given, and of the 14 warnings verified as to force, 13, or 92·9 per cent., were fully verified.

No. 1. At 9.30 p.m. on the 27th, owing to the development of a depression over the Lake Region, the west cone was ordered for Port Colborne, on Lake Erie, and also for all Lake Ontario stations, and early next day a moderate gale prevailed generally from the westward at all places warned. At 10 a.m. on the 28th, cautionary signals for a moderate storm were further extended to the stations in the St. Lawrence and Ocean districts, the depression being then situated over the Ottawa Valley. Afterwards, however, it quickly dispersed, and except at Father Point, where 48 miles an hour occurred, no storm was elsewhere felt. Signals were lowered on the night of the 28th.

PROBABILITIES.

The probabilities issued by this office at 11 p.m. each evening are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m.

The number of predictions issued during the month was 579. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA	96	78	11	7	87.0
LOWER LAKE REGION.....	105	89	10	6	89.5
UPPER ST. LAWRENCE	97	75	17	5	86.1
LOWER ST. LAWRENCE.....	96	72	12	12	81.2
GULF.....	93	62	18	13	76.3
MARITIME PROVINCES	92	68	15	9	82.1
TOTAL	579	444	83	52	83.9

The percentage of verification is obtained by taking the sum of those fully verified and half the sum of those partly verified and dividing by the whole number.

In ascertaining the percentage of verification of the predictions the reports from the agents at the "Probability Stations," as well as the telegraphic reports, are used.

The daily probabilities were issued by Probability Officer R. F. Stupart.

TORONTO OBSERVATORY—MAGNETIC REVIEW FOR AUGUST, 1891.

The magnets were comparatively steady until the morning of the 2nd when a slight disturbance set in which became more marked during the evening, an easterly extreme occurring at 7.10 p. m. The magnet then gradually regained its normal reading after which it remained considerably quieter until after midnight when the movements again increased. A gradual increase of westerly declination is shown between midnight and 1.40 a. m. of the 3rd when the westerly movement was considerably accelerated, culminating in a well marked westerly extreme at 2.03 a.m. Another westerly extreme was recorded at 5.25 a. m. After 6 a.m. the disturbance became less active but was visible up to the morning of the 5th. On the 8th a slight disturbance prevailed. The diurnal curve of declination was well marked on the morning of the 9th, and on this night the magnets were slightly disturbed. From the 10th to the 17th the magnets were seldom at rest, slight disturbance being shown especially during the night and morning hours. A quiet period then followed, lasting up to the afternoon of the 19th when the magnets became slightly disturbed but quieted down on the afternoon of the 20th.

A rapid increase of westerly declination is shown on the mornings of the 21st and 23rd and some sharp oscillations between 5 and 6 p. m. of the 21st. From the afternoon of the 22nd to the evening of the 28th the magnets were moving very regularly. On the 28th, at 8.35 p. m., an important disturbance began, the declination magnet at first moving slowly east, the extreme being reached at 9.25 p. m. It then trended west, attaining its westerly extreme at 11.10 p. m. A sharp vibration then commenced, after which it turned east, a second minimum being recorded at 11.45 p.m. All morning of the 29th the disturbance was active, notably between 3.30 and 4.10 a.m., another marked westerly maximum taking place at the latter hour. Both forces were generally decreased during this disturbance. The horizontal component began to diminish after 8 p.m. of the 28th and continued so until 11.33 p.m. A recovery then set in and by 3 a.m. the magnet was at its normal reading. On the evening of the 29th the movements again increased. A double easterly minimum was shown at 6.45 and 9.40 p.m. After 10.15 p.m. the disturbance became less active but the magnets continued unsteady to the end of the month.

Auroral light was observed on the 10th (Class III), on the 13th (Class IV), on the 28th auroral arch and streamers, varying from Class II to Class IV, and faint auroral light on the 29th. On the 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 11th, 12th, 15th, 16th, 17th, 18th, 19th, 21st, 24th, 25th, 26th and 31st the sky was clear but no aurora was observed. On all other nights clouds or haze would have hidden any aurora which might have existed.

CHARLES CARPMAEL,

Director.

METEOROLOGICAL OFFICE,

TORONTO, October 12th, 1891.



METEOROLOGICAL SERVICE, DOMINION OF CANADA.

Monthly Weather Review.

SEPTEMBER, 1891.

INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraphic reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

ATMOSPHERIC PRESSURE.

The average pressure, as determined from the observations taken at telegraph reporting stations was slightly below the normal from Port Arthur westward, and above the normal at all other stations.

September was chiefly remarkable for the long continuance of very warm weather in Ontario and Quebec, and for the prevalence of the anticyclonic distribution of pressure in the eastern half of the continent. A noticeable feature of the month also, was the passage of the severe storm over the Maritime Provinces during the evening and night of the 7th.

The month opened with a shallow depression situated over Manitoba, and with anticyclonic conditions covering the other portions of the continent, the highest pressure being over our Rocky Mountain slope. The weather was inclined to be showery in Manitoba as well as in parts of the St. Lawrence valley, and along the Nova Scotian coast, elsewhere it was generally fair; temperature was about its average, and the winds varied between light and fresh.

The depression as it passed into the Lake Region between the 1st and 2nd, at first increased somewhat in energy, but soon again decreased, and during the 3rd and 4th, travelled the St. Lawrence Valley as a very minor disturbance. Owing to its influence showers or thunderstorms occurred in nearly all localities from the Lakes to the Atlantic, and in some parts of the Georgian Bay the wind for a time increased to a moderate gale.

The passage of a disturbance from British Columbia over the Territories and Manitoba between the 3rd and 5th, was attended by strong southerly and westerly winds, but apparently no rain fell. The disturbance dispersed after leaving Manitoba.

The movement on the 5th, of a shallow depression from the southward to the Lake Region, gave heavy rains. At night these spread to the Upper St. Lawrence Valley, and on the 6th, as the depression passed to the Gulf, it rained heavily in Quebec and the Maritime Provinces.

On the evening of the 7th, a storm of great importance, seemingly a West India hurricane, moved on to the Nova Scotian coast from the Atlantic. This storm travelled a long way off the American coast, and gave practically no warning of its approach. Its effect in the Maritime Provinces was to cause, during the evening and night of the 7th, a disastrous gale from the south-east, veering to the westward, attended by a great downpour of rain; over four inches was recorded in some places; much damage was done both on land and at sea, the fishing fleet suffered severely, and many lives were lost. The storm centre travelled very fast, and by eight a.m., on the 8th, it had reached the Straits of Belle Isle.

The anticyclonic distribution of pressure, which prior to the passage of the storm over the Maritime Provinces, had existed for several days in our North West, accompanied by fine warm weather, spread between the 7th and 8th to the Lake Region and as far as the Atlantic Coast, its accompanying fine weather being everywhere experienced. Eventually, however, it gave way to the passage of two shallow depressions from the North West.

The first of these depressions brought local showers and thunderstorms in Ontario on the night of the 12th; on the following day in Quebec, and on the 14th in the Maritime Provinces. The second depression caused showers in Ontario on the night of the 14th, and during the 15th.

On the 18th a moderately deep disturbance, which apparently originated in the first place over the West and North-West States, travelled with rapidity from Lake Superior and over the St. Lawrence Valley to the Gulf. It gave a few local thunderstorms in the Lake Region, and showers and thunderstorms generally in Quebec and the Maritime Provinces, as well as a moderate southerly to westerly gale in many portions of the Gulf.

The fine weather then again asserted itself from the Lakes to the Atlantic, and afterwards, until nearly the end of the month, a period of very fine weather was experienced, interrupted however in the St. Lawrence Valley and the Gulf, by some showers on the 21st and again on the 24th and 25th. The distribution of pressure was almost entirely anticyclonic, and the heat in Ontario was as a rule excessive, maxima of over 80° were daily recorded from the 20th to the 28th, inclusive, and the nights were very close. In Quebec it was also as a rule very warm, and in the Maritime Provinces, although the heat was not so marked as elsewhere, the temperature was for the most part above the average. The winds were strong in the St. Lawrence Valley and the Gulf on the 25th, with this exception they were, during this protracted interval, light or moderate in all districts.

A moderately deep disturbance which in the first place had passed over the North-West and Manitoba, traversed on the 29th the Lakes and St. Lawrence districts to the Gulf, and taken in connection with an important anticyclone which developed in its rear, caused strong winds and gales from the south veering to the west and north in Ontario and Quebec, together with showers and thunderstorms and a change to much cooler weather. In the Maritime Provinces, also, the winds were fresh to strong, and there were some local showers, and a change to cooler weather.

The 30th, from the Lakes to the Atlantic, was a fine pleasant day attended by pressure much above the average.

In the North-West Territories and Manitoba from the 7th and until the end of the month the distribution of pressure was almost entirely cyclonic; depressions, mostly from the Pacific, followed one another in quick succession; many of these were moderately deep when passing over the country, but they usually became dispersed after leaving Manitoba. The weather was very unsettled, showers and thunderstorms were almost of daily occurrence, and the winds often increased to strong breezes or gales. On the 8th and 9th, maxima of 94° were experienced in some localities, and between the 17th and 19th 94° was again recorded. Frost occurred in the Rocky Mountain slope on the 11th, and in all districts from the 26th, until the 30th. Snow fell in most places between the 28th and 30th.

TEMPERATURE.

The average temperature has been generally from 2° to 7° above the normal throughout the Dominion.

The highest and lowest temperatures in each Province during September were:

British Columbia, $93^{\circ}0$ on 5th, at Griffin Lake; $25^{\circ}0$ on 28th and 30th at Barkerville.

N. W. Territories, $94^{\circ}0$ on 9th, at Medicine Hat; $24^{\circ}4$ on 20th, at Calgary.

Manitoba, $94^{\circ}0$ on 19th, at St. Albans; $12^{\circ}0$ on 13th, at Fort Ellice.

Ontario, $94^{\circ}0$ on 25th, at Peterborough; $24^{\circ}7$ on 14th, at White River.

Quebec, $86^{\circ}0$ on 25th, at St. Hyacinthe; $32^{\circ}0$ on 9th, at Brome.

New Brunswick, $85^{\circ}0$ on 25th, at Bathurst; $26^{\circ}0$ on 20th, at Dalhousie.

Nova Scotia, $80^{\circ}0$ on 12th, at Halifax; $31^{\circ}0$ on 24th, at Truro.

P. E. Island, $80^{\circ}0$ on 25th, at Georgetown; $35^{\circ}4$ on 22nd, at Kilmahumnaig.

ERRATUM.— From the 1st March to end of July, 1861, through an error in measurement double the quantity of rain that actually fell, has been recorded at Stony Mountain, Manitoba.

RESULTS OF OBSERVATIONS at Spencer's Bridge, B.C., during 1891, Lat. 50°25' N., Long. 123°30' W., Height above Sea 770 Feet.

	PRESSURE.			TEMPERATURE OF AIR.				MEAN TEMPERATURE OF			N.	DIRECTION OF WIND FROM					RAINS.		SNOW.		No. of fogs.
	Mean.	Highest.	Lowest.	in.	in.	in.	in.	Mean.	Highest.	Lowest.	in.	in.	in.	in.	in.	in.	Amount.	Days.	Amount.	Days.	
January,	30.195	30.761	29.563	1.165	32.9	12.0	40.95	35.20	33.13	35.0	39.5	58	0.32	1	35	0	0	3	0	0	1
February,	30.012	30.538	29.244	1.294	44.0	0.0	38.43	32.39	30.04	33.5	36.2	79	0.61	3	11	10	2	0	2	9	3
March,	30.057	30.326	29.502	0.974	64.0	1.0	48.52	35.16	32.42	34.0	36.5	50	0.42	0	1	13	0	2	13	1	0
April,	29.910	30.483	29.427	1.046	75.0	2.0	64.14	38.60	35.54	39.0	34.9	33	0.43	1	0	4	3	4	22	17	0
May,	29.924	30.318	29.545	0.773	95.0	3.0	79.30	47.35	32.13	48.0	42.1	47	0.40	0	0	3	6	7	17	16	0
June,	29.828	30.112	29.566	0.606	85.0	4.0	77.95	33.44	24.84	35.0	48.0	37	0.66	1	0	7	1	4	18	18	1
July,	29.874	30.194	29.503	0.631	102.0	4.0	89.35	35.94	30.47	33.0	36.4	43	0.33	0	0	3	10	9	16	16	0
August,	29.922	30.315	29.706	0.629	90.0	32.0	85.43	38.30	34.74	40.0	36.8	50	0.30	0	1	13	4	2	7	20	1
September,	29.926	30.455	29.615	1.445	97.0	39.0	72.00	50.90	31.10	33.0	32.4	61	0.54	0	5	10	2	10	24	0	0

STATIONS RECEIVED TOO LATE FOR AUGUST REVIEW.

PROVINCE.	STATION.	MEAN TEMP.	HIGHEST TEMPERATURE.		LOWEST TEMPERATURE.		PRECIPITATION.		AURORAS.	THUNDER STORMS.
			Temp.	Date.	Temp.	Date.	Amount.	Days.		
		°	°		°		in.			
British Columbia	Keremeos.....	.....	91.3	23	.....	.....	0.75	5		
N. W. Territories.....	Regina	60.71	86.5	4	36.0	27	1.25	7		2, 6, 7, 8.
Manitoba.....	Lake Dauphin.....	64.65	92.0	7	31.0	26	1.00	7		5.
Ontario.....	Alton.....	63.59	85.7	8	38.5	20	5.60	10		8, 9, 10, 11, 21, 24, 31
	Waukegan	66.65	90.0	9	40.0	20	4.35	8		
	Guelph.....	65.10	93.9	9	41.1	28	3.96	10		

Lake Dauphin rainfall on 3rd, 1.25 in. ; on 7th, 2.00 in. ; at Alton, Ont., 3.45 in. of rain fell on 9th ; at Guelph, 2.25 in. fell on 9th.

PRECIPITATION.

The rainfall in Ontario, Quebec and Manitoba has been below the average ; in the other Provinces it has exceeded the average, the excess being greatest in British Columbia. The excess in the Maritime Provinces was mainly caused by a heavy downpour during the passage of a depression originating in the West Indies. During this storm at Point Escuminac 2.71 in. fell. Pictou, 2.15 in. ; Point Lepreaux, 2.90 in. ; St. John, 1.92 in. ; Truro, 2.60 in. ; Kilmahunaig, 1.90. ; Dorchester, 2.29 in. ; Georgetown, 2.21 in. ; Fredericton, 1.55 in. ; Grindstone, 4.64 in. ; Chatham, 1.20 in. ; Digby, 4.80 in. ; Charlottetown, 3.57.

The general distribution is as follows :—

In BRITISH COLUMBIA the rainfall was 5.04 in., or 3.46 above the average.

In the NORTH-WEST TERRITORIES the rainfall was 0.92 in., or about 0.17 in. above the average.

In MANITOBA the rainfall was 1.41 in., or 0.30 below the average.

In ONTARIO, West and South-West District it was 2.22 in. ; or 0.60 in. below the average. In the North and North-West district it was 2.34 in., or 1.35 in. below the average. In the Central District it was 2.07 in. or 0.59 in. below the average ; and in the East and North-East Districts it was 1.48 in., or 1.45 in. below the average.

In QUEBEC it was 2.53 in. or 0.71 in. below the average.

In NEW BRUNSWICK it was 3.46 in., or 0.52 in. above the average.

In NOVA SCOTIA it was 4.07 in., or 0.80 in. above the average.

In PRINCE EDWARD ISLAND it was 4.41 in., or 1.50 in. above the average.

Rainfall 5 in. and upwards during month :—

BRITISH COLUMBIA, Agassiz, 7.83 in. ; Port Moody, 8.59 in. ; Abbotsford, 8.08 in. ; Griffin's Lake, 6.52 in.

ONTARIO, Little Forks, 11.20 in. ; Ignace, 5.69 in.

QUEBEC Grindstone, 5.71 in.

NEW BRUNSWICK Dorchester, 5.31 in.

NOVA SCOTIA Yarmouth, 5.55 in. ; Digby, 7.90 in.

PRINCE EDWARD ISLAND Charlottetown, 5.09 in.

BERMUDA, 8.91 in.

Rainfall 1 inch and upwards in 24 hours :

1st, Richmond, 1.00 in. ; Barclay, 1.00.

2nd, Port Hastings, 2.47 in.

3rd, Dorchester, 1.56 in. ; Sydney, 1.51 in. ; Little Forks, 2.50 in.

5th, Alton, 1.56 in. ; Bancroft, 1.11 in. ; Stoney Creek, 1.27 in. ; Winona, 1.02 in. ; Raleigh, 1.20 in. ; Wiarton, 1.00 in. ; Blenheim, 1.34 in. ; Acton, 1.08 in. ; Burk's Falls, 1.00 in. ; Orangeville, 1.32 in. ; Georgetown, 1.20 in. ; Ignace, 1.25 in. ; Sombra, 1.07 in.

6th Port Hope, 1.60 in. ; Fergus, 1.48 in. ; Lakelfield, 1.25 in. ; Clontarf, 1.17 in. ; Peterboro', 1.10 in. ; Elora, 1.09 in. ; Conestogo, 1.03 in.

7th, Port Escuminac, 1.30 in. ; Glastonbury, 1.00 in. ; Pictou, 2.15 in. ; Point Lepreaux, 2.00 in. ; St. John, 1.92 in. ; Truro, 1.22 in. ; Grindstone, 1.58 in.

8th, Grindstone, 3.06 in. ; Point Escuminac, 1.41 in. ; Kilmahunaig, 1.90 in. ; Dorchester, 2.29 in. ;

Georgetown, P.E.I., 2'21 in.; Digby, 4'80 in.; Fredericton, 1'55 in.; Truro, 1'38 in.; Charlottetown, 3'57 in.; Chatham, 1'20 in.

9th, Bermuda, 1'29 in.

11th, Watford, 1'62 in.; Little Forks, 2'00 in.; Barclay, 1'00 in.

12th, Conestogo, 1'79 in. in 2½ hours; Coldstream, 1'41 in.; Owen Sound, 1'35 in.; Elora, 1'24 in.; Stoney Creek, 1'29 in.; Little Forks, 1'40 in.

13th, Lucknow, 1'45 in., 1'20 in. fell in 28 minutes; Novar, 1'38 in.

14th, Cowal, 1'07 in.; Digby, 2'50 in.; Little Forks, 2'00 in.

15th, Abbotsford, B.C., 1'22 in.; Griffin's Lake, 4'60 in.

16th, Abbotsford, B.C., 2'60 in.; St. Johns, Nfld., 2'04 in.

17th, Agassiz, 2'37 in.; Esquimalt, 1'16 in.; Port Moody, 2'75 in.

18th, Agassiz, 1'74 in.; Port Moody, 2'43 in.

19th, Barclay, 1'00 in.

20th, Savanne, 1'20 in.

21st, Bermuda, 2'11 in.

22nd, Bermuda, 3'22 in.

24th, Point des Monts, 1'40 in.; Little Forks, 1'30 in.

27th, Heron Bay, 1'00 in.

28th, Heron Bay, 1'00 in.; Savanne, 1'05 in.; Nepigon, 1'31 in.; Buda, 1'05 in.

29th, Point Clark, 1'01 in.; Nepigon, 1'01 in.

Thunder recorded on -

1st, Oak Bank, Ennismore, Buda, Point Lepreaux, Richmond, Posen, Savanne, St. John, St. Hyacinthe, Winnipeg.

2nd, St. John, N.B., Cartier, Stoney Creek, Digby, Novar, Alton, Sombra, Zurich, Peterborough, Joly.

3rd, Scarborough, Eau Claire, Georgetown (Ont), Uplands, Point Clark, Beatrice, Bancroft, Paris, Mattawa, Zurich, Owen Sound, Whiteside, Bognor, Durham, Deseronto, Ottawa.

5th, Nelson, Eau Claire.

6th, Georgetown (Ont), Novar, Alton, Mattawa, Bognor.

7th, Kilmahumag.

8th, Truro.

10th, St. Albans, Turtle Mountain, Russell, Posen, Fort Ellice, Cotham, Elkhorn, Winnipeg.

11th, Hillview, Oak River, Roseberry, Killarney, Cowal, Winnipeg, Little Forks.

12th, Stoney Creek, Beatrice, Novar, Elora, Gravenhurst, Egremont, Alton, Sombra, Mattawa, Birnam, Kingsville, Owen Sound, Whiteside, Joly, Bognor, Durham, Toronto, Oak River, Scarborough, Cayuga, Wiarton, Lion's Head, Blenheim, Presque Isle, Wyoming, Burk's Falls, Georgetown (Ont), St. Thomas, Thedford, Sharon, Sprucedale, Uplands.

13th, St. Albans, Roseberry, Nelson, Wyoming, Acton, Princeton, Digby, Posen, Fort Ellice, Sombra, Paris, Birnam, Pelee Island, Woodstock, Petrolea, Winnipeg.

14th, Russell, St. John, N.B., Cowal, Point Lepreaux, Birnam, Zurich, Dorchester, N.B., St. John, Winnipeg.

15th, Truro, Channel Island, Toronto, Winnipeg, Nelson, Point Escuminac, Wilton Grove, Wyoming, Georgetown (Ont), St. Thomas, Thedford, Stoney Creek, Posen, Elora, Cotham, Egremont, Gladstone, Birnam, Deseronto.

16th, St. Albans, Roseberry, Eau Claire, Burk's Falls, Buda, Sprucedale, Uplands, Posen, Mattawa, Haliburton, Savanne, Winnipeg.

17th, Russell, Cayuga, Killarney, Point Lepreaux, Bancroft, Owen Sound, Haliburton, Savanne, Bognor, Durham, Channel Island, Winnipeg.

18th, Bancroft, Elora, Chicoutimi, Alton, Georgina, Sombra, Paris, Birnam, Brantford, Georgetown, P.E.I., Zurich, St. Mary's, Owen Sound, Agassiz, Joly, Bognor, Kilmahumag, St. John, Woodstock, Fredericton, Petrolea, Lindsay, St. Hyacinthe, Brome, Toronto, St. John, N.B., Nelson, Cowal, Raleigh, Wiarton, Wilton Grove, Burk's Falls, Princeton, Novar, St. Thomas, Thedford, Sharon, Sprucedale, Uplands, Stoney Creek, Digby, Beatrice.

19th, Scarborough, Barclay, Georgetown (Ont), Buda, Savanne, Port Moody, Truro.

20th, Scarborough, Buda, Cartier, Port Moody.

- 21st, Roseberry, Savanne, Ignace, Channel Island, Winnipeg.
 22nd, Oak Bank, Killarney, Winnipeg.
 23rd, Savanne,
 25th, Chicoutimi, Barkerville.
 27th, Buda.
 28th, Wiarton, Wilton Grove, Lion's Head, Georgetown (Ont.), Sprucedale, Uplands, Zurich, Joly, Bognor, Esquimalt.
 29th, Zurich, St. Mary's, Whiteside, Joly, London, Durham, Coldwater, St. Albans, Presque Isle, Sunshine, Burk's Falls, Georgetown (Ont.), Aurora, Princeton, Sharon, Beatrice, Novar, Elora, Egremont, Chicoutimi, Sombra, Birnam, Kingsville.
 30th, Turtle Mountain, Little Forks.

Auroras recorded on—

- 1st, Eau Claire, Georgetown, Alton, II ; Posen, I ; Uplands, Prince Albert, III.
 2nd, Joly, IV ; Chicoutimi, IV ; Gravenhurst, II ; Cape Chatte, Uplands, Sharon, III ; Minnedosa, II ; Alexandria, III ; Father Point, IV ; Medicine Hat, IV.
 3rd, St. Albans, IV ; Point Escuminac (very bright) ; Savanne, Dorchester, N.B., I ; Clontarf, IV ; Sydney, III ; Fredericton, Truro, II ; Charlottetown, III ; Father Point, III ; Georgetown, Posen, IV ; Richmond, II ; Cook's Mills (bright) ; Pictou, Cape Chatte, Buda, Minnedosa, IV ; Grindstone, IV ; Channel Island, III ; Winnipeg.
 4th, Bognor, IV ; Chicoutimi, IV ; Sydney, IV ; Little Forks, III ; Port Arthur, I ; Father Point, IV ; St. Hyacinthe, Montreal, II ; Winnipeg.
 5th, Little Forks, III.
 6th, Posen, II.
 7th, Eau Claire, Oak Bank, III ; Posen, III ; Port Stanley, III ; Grindstone, IV ; Winnipeg, IV.
 8th, St. Albans, III ; Russell, II ; Eau Claire, Georgetown, IV ; Scarboro', Bognor, IV ; Savanne, Hillview, Haliburton, Joly, IV ; Clontarf, IV ; Peterboro', II ; Elkhorn, Ridgetown, Georgetown, Father Point, IV ; Quebec, III ; Grand Manan, IV ; Port Dover, IV ; Swift Current, II ; Channel Island, III ; Toronto, II ; Winnipeg, II ; Sombra, II ; Chicoutimi, IV ; Egremont, II ; Cotham, II ; Gravenhurst, IV ; Elora, Novar, IV ; Posen, I ; Richmond, III ; Point Clark, II ; Stoney Creek, IV ; Sharon, III ; St. John, IV ; Sydney, IV ; Fredericton, Alexandria, III ; Durham, II ; Lindsay, IV ; Coldwater, II ; Prince Albert, IV ; Port Stanley, III.
 9th, St. Albans, I ; Russell, II ; Cayuga (beautiful) ; Nelson (brilliant) ; Killarney, Raleigh, Eau Claire (grand) ; Blenheim, Burk's Falls, Georgetown, IV ; St. Thomas, IV ; Scarboro', Coldwater, I ; Deseronto, II ; Port Arthur, I ; Edmonton, III ; Port Stanley, III ; Kingston, III ; Father Point, IV ; Quebec, III ; Yarmouth, III ; Minnedosa, III ; Saugeen, III ; Medicine Hat, IV ; Channel Island, III ; Toronto, II ; Winnipeg, III ; Stoney Creek, IV ; Sharon, II ; Cartier (very bright) ; Fredericton, Esquimalt, IV ; Durham, III ; Conestogo, I ; Bognor, II ; Savanne, Hillview, Haliburton, II ; Pelee Island, Joly, I ; Clontarf, II ; Sydney, III ; Peterborough, I ; Elkhorn, Ridgetown, Zurich, Mattawa, Paris, Gladstone, Sombra, III ; Georgina, Chicoutimi, IV ; Egremont, I ; Cotham, III ; Fort Ellice, II ; Gravenhurst, I ; Elora, Bancroft, I ; Novar, III ; Oak Bank, II ; Posen, I ; Richmond, III ; Cook's Mills, Beatrice, III ; Point Clark, II.
 10th, Nelson, III ; Eau Claire, Georgetown, IV ; Bognor, IV ; Savanne, Joly, IV ; Dorchester, II ; Clontarf, IV ; Peterboro', IV ; Georgetown, P.E.I., Birnam, III ; Paris, Sombra, IV ; Fort Ellice, Charlottetown, IV ; Father Point, III ; Quebec, III ; Yarmouth, IV ; Minnedosa, I ; Winnipeg, I ; Swift Current, II ; Medicine Hat, II ; Grindstone, II ; Channel Island, IV ; Toronto, III ; Truro, III ; Ottawa, IV ; Port Arthur, I ; Port Stanley, III ; Kingston, II ; Gravenhurst, IV ; Elora, Bancroft, II ; Novar, IV ; Oak Bank, I ; Posen, II ; Richmond, III ; Cape Chatte, Uplands, Sharon, II ; St. John, IV ; Sydney, IV ; Alexandria, II ; Durham, II ; Conestogo, III ; Deseronto, I.
 11th, St. Albans, I ; Killarney (very fine) ; Eau Claire, St. Thomas, III ; Thedford, III, (very beautiful) ; Bognor, IV ; Hillview, Joly, II ; Dorchester, I ; Clontarf, III ; Elkhorn, Ridgetown, Channel Island, III ; Toronto, II ; Winnipeg, II ; Georgetown, P.E.I., Birnam, III ; Chicoutimi, IV ; Cotham, II ; Elora, Bancroft, II ; Novar, III ; Oak Bank, Posen, III ; Richmond, IV ; Beatrice, III ; Dalhousie, N.B., (brilliant) ; St. John, I ; Sydney, VI ; Alexandria, I ; Durham, II ; Deseronto, II ; Truro, IV ; Kingston, I ; Grand Manan, IV ; Medicine Hat, III ; Montreal, II.

- 12th, Pelee Island (bright); Georgetown, Chicoutimi, IV; Dalhousie, N. B., Sydney, III; Deseronto, II; Port Stanley, II; Winnipeg, IV.
 13th, Posen, IV.
 17th, Channel Island, IV.
 20th, Little Forks, II; Channel Island, IV.
 21st, Birnam, IV; Posen, III.
 22nd, Fort Ellice, I; Little Forks, III.
 23rd, Truro, IV.
 24th, Russell, II; Winnipeg, IV.
 25th, St. Albans, II; Russell, II; Savanne, Hillview, Elkhorn, Alton, III; Durham, I; Minnedosa, IV; Winnipeg, III.
 26th, Haliburton, II; Clontarf, IV; Zurich, Georgetown, Chicoutimi, IV; Egremont, IV; Cotham, II; Gravenhurst, IV; Bancroft, II; Richmond, IV; Cape Chatte, Alexandria, II; Truro, IV; Port Arthur, II; Minnedosa, IV; Winnipeg, IV.
 27th, Bognor, IV; Dorchester, IV; Georgetown, Chicoutimi, IV; Egremont, IV; Gravenhurst, IV; Elora, Bancroft, IV; Alexandria, II; Durham, I; Grand Manan, IV; Yarmouth, III; Winnipeg, II.
 28th, St. Albans, III; Russell, I; Nelson, IV; Eau Claire, Georgetown, IV; Haliburton, Clontarf, IV; Cotham, I; Gravenhurst, IV; Elora, Bancroft, III; Novar, IV; Posen, IV; Cook's Mills, Beatrice, IV; Elkhorn, Ridgetown, Georgetown, Brantford, Birnam, IV; Alton, II; Egremont, III; Point Clark, Stoney Creek, III; Sharon, III; Sydney, III; Alexandria, II; Little Forks, II; Lindsay, IV; Deseronto, Ottawa, IV; Prince Albert, II; Kingston, III; Toronto, IV; Winnipeg.
 29th, Cayuga, Brantford, Birnam, IV; Sharon, III; Sydney, III; Alexandria, III; Prince Albert, III.

Frost recorded on the following days during month.

- 1st. Greenwood.
 3rd. St. Albans, Clandeboye (27°), Killarney, Oak Bank (26°), Brandon, Gladstone (*wheat damaged*), Russell (29°), Hillview.
 4th. Buda (27°), Savanne (27°).
 5th. Eau Claire, Midland (*heavy*), Sprucedale.
 7th. Eau Claire, Sprucedale.
 8th. St. Albans, Oak Bank (26°), Clandeboye (25°), Eau Claire, Acton, Burk's Falls, Scarborough, Sprucedale, Uplands, Brandon, Novar, Egremont, Lucknow, Gladstone (*potatoes killed*), Joly (30°), Russell (30°), Savanne (25°), Winnipeg.
 9th. Killarney, Acton, Uplands, Alton, Georgina, Lucknow, Sombra, Birnam, Savanne.
 10th. Barkerville (*snow*).
 11th. Barkerville (*snow*), Truro.
 12th. Greenwood, Dalhousie, N.B.
 13th. St. Albans, Turtle Mountain (26°), Eden, Fort Ellice (12°), Killarney, Craigilea, Brandon, Cotham, Glen Adelaide (25°), St. Albans (28°), Russell (17°), Hillview.
 14th. Thompson, Missanabic (30°), Cotham.
 15th. Renfrew (20°), Alexandria.
 16th. Digby (*hard*).
 18th. North Bay (30°).
 19th. Barkerville.
 20th. Dalhousie (26°), Dorchester, N.B., Truro, Brome.
 21st. Keremeos, B.C., Barkerville.
 23rd. Scarborough, Esquimalt.
 24th. Dorchester, N.B., Truro.
 26th. Napinka.
 27th. Brandon, Barkerville (*snow all day*), Russell (21°).
 28th. Eden (*severe*), Cotham, Barkerville (25°), *heavy snow*.
 29th. St. Albans, Sunnyside (26°), Turtle Mountain (*1/2 in. ice*), Clandeboye, Killarney, Thompson (*hard*), Point Clark, Brandon, Posen, Cook's Mills, Glen Adelaide (25°), St. Albans (24°), Cotham, Russell (20°), Hillview, Winnipeg.
 30th. Wiarton, Eau Claire (*heavy*), Acton, Georgetown, Uplands, Novar, Maple Creek (*snow*), Cotham, Egremont, Alton, Georgina, Sombra, Birnam, Barkerville (25°), Joly (30°).

Sept. 21st, at Esquimalt, two distinct shocks of earthquake, 1st at 3.30 a.m., 2nd at 3.50 a.m., windows rattled and houses shook, rumbling noise after shock, 1st shock from N. to S., 2nd from E. to W.

Sept. 16th, at St. Albans, Man., observer records a fine meteor at 6 p.m. (solar time), travelled from S.S.E. to S.S.W., about 40° above horizon burst, heard report several minutes after.

Sept. 10th, at Richmond, O., Mr. Webber reports at 9.15 this evening a meteor passed slowly in a westerly direction, first appearing near "Capella" and vanishing before reaching the horizon, size and brilliancy equal to the planet Jupiter which could be seen at the same time.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF SEPTEMBER, 1891.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMALT			0 07	0 28	0 40	0 34	0 44	0 42	0 44	0 51	0 39	0 43	0 38	0 04	S.	..
AGASSIZ, B.C.				05	24	25	32	28	28	32	35	34	00		..	..
BRANDON.....		S.	13	41	51	60	62	67	68	68	66	60	56	24		..
INDIAN HEAD.....			00	08	52	67	65	59	61	62	66	58	25	S.		..
WINNIPEG.....			23	51	52	54	56	54	53	58	52	51	55	39	..	..
KINGSVILLE			09	59	89	93	91	91	91	86	83	80	26	03	..	..
WOODSTOCK		S.	09	51	74	86	91	87	85	87	79	73	44	04		..
TORONTO.			16	64	76	79	81	86	86	85	85	76	76	39	..	..
LINDSAY.....			23	48	67	76	82	81	78	82	77	72	50	43	06	..
BARRIE.....														
KINGSTON		S.	14	49	61	62	62	76	83	81	77	71	60	02	..	..
.....																
MONTREAL.....			12	44	63	70	66	74	78	79	78	72	47			..
FREDERICTON		S.	24	47	69	65	76	79	77	75	63	57	53	31	S.	..
SYDNEY.....			20	42	56	60	60	68	72	69	69	64	58	27		..
MEAN PROPORTION FOR MONTH.....			0 33	0 12	0 51	0 42	0 47	0 64	0 61	0 67	0 63		0 57	0 63	0 53	0 53
(Constant sunshine being 1.)																
MAXIMUM DAILY AMOUNT.			0 93	0 69	0 89	0 78	0 93	0 83	0 80	0 92	99		0 90	0 97	0 93	0 91
DATE			23	5	9	19	25	1	4	30	30		30	19	19	10
NO. OF DAYS COMPLETELY CLOUDED.			8	11	2	3	0	1	1	1	2		2	0	3	3

PROBABILITIES.

The probabilities issued by this office at 11 p. m. each evening are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a. m. the following day.

The number of predictions issued during the month was 634. These were divided as follows: -

DISTRICT.	V E R I F I E D.				Percentage.
	No. Issued.	No. Fully.	No. Partly.	No. Not.	
MANITOBA	97	84	4	9	88.7
LOWER LAKE REGION	113	86	14	13	82.3
UPPER ST. LAWRENCE	108	87	9	12	84.7
LOWER ST. LAWRENCE	103	74	12	17	77.7
GULF	115	72	16	17	76.2
MARITIME PROVINCES	108	87	9	12	80.6
TOTAL	614	490	64	80	83.1

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by 2 and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at the "Probability Stations," as well as the telegraphic reports, are used.

The daily probabilities were issued by Probability Officer B. C. Webber.

STORM WARNINGS.

During the month warnings on the approach of three storms were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 86, of which 54, or 62·8 per cent., were verified. Fourteen stations reported warnings received late, owing to delay in issue, and in twenty cases the velocity exceeded that indicated by the signal.

In connection with the warnings, predictions as to the probable directions of wind were given, and of the 54 warnings verified as to force, 51, or 94·4 per cent., were verified as to direction.

No. 1. At 8 a. m. of 2nd, owing to a developing depression over Lake Superior signal No. 2, for a moderate south-west, veering to west and north-west gale, was ordered for all lake stations. The storm centre moved eastward with diminishing energy, causing strong southerly winds during night of 2nd, followed by strong north-westerly winds next day on the Georgian Bay and upper part of Lake Huron, but generally on the lakes the wind did not exceed a fresh breeze. Signals were lowered during the forenoon of 3rd.

No. 2. On the 7th a quickly falling barometer with rain on the coasts of New England and Nova Scotia, indicated a disturbance at sea, and at 4 p.m. cautionary signal No. 1 was ordered for Nova Scotia and Bay of Fundy ports. At 8 p.m. the centre of an important storm of small diameter was near Yarmouth, Nova Scotia, whence it moved quickly northeastward across Prince Edward Island to the Straits of Belle Isle. At 9 p.m. signals were ordered for all Maritime Provinces not warned in the afternoon, but in most instances the warnings were received too late to be of any value.

On the north shore of the Bay of Fundy and in the Gulf north of the Miramichi, the storm was scarcely felt, but in Nova Scotia and Prince Edward Island it was very severe and destructive. Yarmouth reports the blow heaviest from northeast from 9 to 9.30 p.m.; Halifax, midnight, to 1 a.m. S.E. heavy gale; Charlottetown, 3 a.m., heavy gale N.W.; Port Hastings, 2 a.m., S.E. heavy gale; Sydney, C.B., midnight, strong gale S. The curve taken from a self-recording aneroid barometer on the D.S.S. "Acadia," lying in Charlottetown harbour, shows that the storm centre passed that station shortly before 2 a.m., and a similar curve from an instrument on the French flag ship lying in Port au Choise, Nfld., shows that the centre passed that place about 10 a.m. on the 8th. Signals were lowered during the forenoon of the 8th.

No. 3. On the morning of the 28th there was a developing depression over Lake Superior, and at 10.50 a.m. of the 28th Signal No. 2 was ordered for Lake Superior stations and No. 1 for Lake Huron and the Georgian Bay for a moderate gale between south and west; at 10 p.m. the warning was extended to Lake Erie Stations. A moderate to fresh southwest, veering to northwest, gale prevailed during the 28th on Superior, and set in at night on the other lakes, at most points reaching its height from the west and northwest during the forenoon of the 29th. As the storm continued its course eastward north of the St. Lawrence Valley, at 11.20 a.m. of the 29th, stations in the northern part of the Gulf and Bay Chaleur were warned to expect a moderate gale, which set in at night and continued most of the following day. Signals at lake stations were lowered about noon of the 29th and in the Gulf early next day.

TORONTO OBSERVATORY.- MAGNETIC REVIEW FOR SEPTEMBER, 1891.

A slight disturbance prevailed on the 1st, the magnet during the afternoon moved steadily east, the disturbance moderated during the afternoon of the 2nd, between 8 and 10 p.m. of the later date a little irregularity is shewn. On the evening of the 3rd slight disturbing action set in, and at 1.10 a.m. a westerly sweep of the declination magnet was registered, the maximum reading taking place at 1.47 a.m., it then gradually returned to its normal reading and remained steady, nothing of importance transpired until the 9th, when the principal storm of the month was registered, in fact it was the largest recorded at the Observatory for some time past. The storm began at 6 p.m. the declination magnet being then on an easterly swing, the movement was considerably accelerated at 6.25 p.m., the minimum being recorded at 6.30 p.m., a rapid rise of 14' followed by a small easterly jog and then a westerly swing; the most rapid movements were recorded between 8 and 9 p.m., the largest being an easterly sweep of 55' at 8.25 p.m., a marked minimum taking place at 8.40; a rapid westerly excursion of 51' then ensued, a quick recovery brought the magnet to its normal reading. The westerly extreme was recorded at 11.45 p.m. the total range being 1° 14'. Some rapid oscillations were shewn between 3 and 4 a.m. of the 10th, at noon the magnet was steady.

A noticeable increase of the v. f. component is shewn from 8 a.m. of the 9th to 6 p.m., a quicker increase then set in lasting a short time ; at 6.30 a sharp decrease began and during the remainder of the storm this component was below its normal value ; a recovery set in at 3 a.m. of the 10th and at 8 a.m. the magnet was at its normal reading and steady. The h. f. too was below its normal value during the chief portion of the disturbance, a sharp increase at 8 p.m. and some rapid oscillations between 2 and 4 a.m. of the 10th were marked features of this curve.

On the evening and night of the 10th another important disturbance was registered, the movements were larger during the night hours. The afternoon and night hours of the 11th were decidedly disturbed, an increase of both components of the force was shewn during the afternoon hours, also from 10 to 11.20 p.m., after this hour a marked decrease was shewn, and after midnight the magnets became considerably quieter. There was nothing of importance recorded until the 26th, when a slight disturbance prevailed all day. On the night of the 27th another small disturbance appeared and the movements increased during the morning of the 28th, after 4 p.m. another increase of the movements is again shewn, a marked easterly minimum being recorded at 4.47 p.m. The disturbance was particularly active during the night hours. A little before 10 p.m. of the 29th, slight disturbing action again appeared and remained visible to the end of the month.

Auroral light and faint streamers was observed at midnight of the 8th ; on the 9th, auroral arch from W. by N. to E. by S., about 5° south of zenith, partial to complete 9 to 9.30 p.m. ; auroral display from 7 p.m. to midnight (class II and III) on the 10th ; auroral arch and faint streamers at midnight ; auroral arch and bright yellow streamers (class IV and III) on the 11th ; faint auroral arch in N. 10.15 to 11.30 arch, short streamers and diffused auroral light reaching near zenith. On the 1st, 2nd, 6th, 7th, 12th, 13th, 16th, 17th, 18th, 19th, 20th, 22nd, 23rd, 24th, 25th, 26th, 27th, 29th and 30th, the sky was clear but no aurora was observed ; on all other nights clouds or haze would have hidden any aurora which might have existed. The auroral displays were general and in many cases of great beauty throughout the Dominion from the 8th to 11th inclusive, and were observed from the Pacific to the Atlantic.

CHARLES CARPMAEL,

Director.

METEOROLOGICAL OFFICE,

TORONTO, November 8th, 1891.

Monthly Weather Review.

OCTOBER, 1891.

INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraphic reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

ATMOSPHERIC PRESSURE.

The average pressure, as determined from the observations taken at telegraph reporting stations, was not far from the normal of seventeen years in New Brunswick, Nova Scotia and Prince Edward Island. In the other provinces it was slightly above the normal.

It may be remarked at outset that the month of October in Manitoba and the North West Territories was unusually fine and was not marked by any very great or rapid pressure changes. In the Lake Region also the month was on the whole a fine one and no storm of any great magnitude occurred. On the Atlantic Seaboard and the Gulf of St. Lawrence however the weather was particularly stormy, several severe Atlantic storms having moved either into the Maritime Provinces or in close proximity to our coasts.

The month opened with an important anticyclone, central in New England and extending westward, over the Lake Region and southward over the Atlantic States accompanied by fine mild weather; in the Northwest Territories there was another anticyclone with cold northerly winds and local snows and between the two a depression extended from Manitoba southward and westward to Wyoming. For two days the pressure changes were slow, the depression moved slowly across Lake Superior bringing local rains in neighbouring districts while the western anticyclone moved southward and there was a rising temperature with fair weather from Manitoba westward. The other anticyclone also drew more to the southward and there was a continuance of fine weather and abnormally high temperature from Lake Huron to Nova Scotia. The charts of the 3rd showed the development of a small subsidiary depression and a well marked rain area over the Upper Mississippi Valley and reports subsequently received show that on that day a hurricane of moderate importance passed northward across Bermuda. The small depression moved slowly across Ontario during the 4th and by next morning had been absorbed by the Atlantic Storm then southeast of Massachusetts. During the 5th higher pressure was spreading to the Lake Region from the west with fair cooler weather while the storm centre moving south of Nova Scotia caused rain and moderate gales in the Maritime Provinces.

A small depression which on the 6th was in the Gulf of Mexico, on the 7th spread quickly northward up the Atlantic Coast as a trough of low pressure accompanied by an extensive rain area embracing the Lake Region as well as all the Atlantic States. On the 8th the centre passed northeastward across the Maritime Provinces there causing very heavy rain while in Ontario the weather cleared and became quite mild as higher pressure spread over the country. By the morning of the 10th there was a rapidly developing anticyclone to the north of Lake Superior and Manitoba, it moved very quickly southeastward with increasing energy accompanied by colder weather and strong northerly winds which at some points on the Lakes reached the force of a gale. While this movement was in progress a depression appeared in the Northwest Territories and moving slowly passed to eastward of Manitoba on the 13th, with strong cold northwesterly winds and local snows prevalent to the westward. The anticyclone attained its maximum development early on the 12th and then hovered with slowly diminishing energy over the St. Lawrence Valley and New England while an important storm moving northward between Bermuda and the American Coast, caused

severe northeast gales along the coast. During the night of the 13th the storm centre approached Nova Scotia and a fresh easterly gale with heavy rain blew in the Maritime Provinces; after this the storm quickly dispersed. The storm mentioned above as passing out of the Northwest Territories on the 13th, was on the morning of the 14th over Lake Superior, whence it moved across Northern Canada to the Gulf, giving rain in Ontario on the 14th and showers in the St. Lawrence Valley and Maritime Provinces on the 15th followed as the barometer rose by clearing mild weather.

On the evening of the 17th there was a depression of some importance over Lake Superior, by next evening it had drawn southward over Ontario where it hovered causing numerous local rains for two days.

On the 18th a hurricane passed a little to the westward of Bermuda moving north, and on 19th passed south of Nova Scotia giving rain with northeast gales along the coast. A subsidiary to this area formed on the Middle Atlantic Coast on the 19th and on the 20th moved northward to the St. Lawrence Valley and thence eastward to the Gulf, it gave a heavy fall of rain from Lake Ontario eastward accompanied in the Gulf by a moderate northeast to northwest gale.

An area of high pressure was during the 22nd moving southeastward from the Northwest Territories; next morning it was central in the Upper Mississippi Valley and there were indications of a cyclonic development on the Middle Atlantic Coast. By night an important storm was central off the New Jersey Coast whence it moved quickly northeastward giving a fresh northeast gale with rain and snow in the Gulf and Maritime Provinces on the 23rd and a cold northwesterly gale on the following day; the high pressure passing across the Lake Region gave slightly cooler weather on the 22nd, but a southwesterly gradient next day again gave higher temperature.

A depression to the northward of the Lakes on the morning of the 26th moved eastward with increasing energy giving rain in the Maritime Provinces, while a quickly developing high area moving from the Northwest Territories brought a northerly gale and colder weather from the Lake Region to the Gulf.

A depression in the Northwest Territories on the 29th gradually developed and moved east while another well marked area of high pressure with colder weather formed behind it; the storm moved pretty quickly eastward across the Lake Region where on the 31st a fall of rain was followed by a fresh westerly gale.

TEMPERATURE.

The average temperature, as determined from the observations taken at telegraph reporting stations, was slightly below the normal at nearly all stations.

The highest and lowest temperatures in each Province during October were:

British Columbia, 82°·0 on 8th, at Agassiz; 14°·0 on 31st, at Barkerville.

N. W. Territories, 76°·9 on 8th, at Calgary; - 8°·0 on 31st, at Maple Creek.

Manitoba, 74°·3* on 29th, at Minnedosa; 10°·0 on 15th, at Sunnyside.

Ontario, 89°·0 on 3rd, at De Cewsville; 10°·4 on 23rd, at Mattawa.

Quebec, 83°·0 on 3rd, at St. Hyacinthe; 13°·4 on 29th, at Chicoutimi.

New Brunswick, 83°·6 on 4th, at Chatham; 17°·3 on 29th, at Fredericton.

Nova Scotia, 76°·0 on 4th, at Sydney; 18°·8 on 30th, at Truro.

P. E. Island, 77°·1 on 5th, at Kilmahumaig; 23°·5 on 30th, at Kilmahumaig.

NOTE. *This is the highest temperature in Manitoba of which we have any knowledge of the thermometer or exposure, but at Roseberry in S. Manitoba Mr. Stack records 98° as having occurred on the 19th.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION, &c.—Continued.

ONTARIO—Continued

ONTARIO—Concluded.

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STATIONS RECEIVED TOO LATE FOR SEPTEMBER REVIEW.

PROVINCE.	STATION.	MEAN	HIGHEST TEMPERATURE.		LOWEST TEMPERATURE.		PRECIPITATION.		AURORAS.	THUNDER STORMS.
		Temp.	Temp.	Date.	Temp.	Date.	Amount.	Days.		
		°	°		°		in.			
N. W. Territories	Pheasant Forks	47.66	80.0	5	39.0	28	.....	2		
	Banff	46.55	77.2	2	23.9	21	0.19	9	1	
Nova Scotia	Sable Island	60.61	73.0	5	53.0	24	1.61	5		13, 14, 15, 29, 30.

PRECIPITATION.

The rainfall in the Dominion has varied considerably. In Ontario, Quebec and the North-West Territories the amount is below the average; and in the remaining Provinces it is above, the excess in Nova Scotia being upwards of 90 per cent. above the average, the excess on the seaboard being caused by several Atlantic storms moving up the coast. Some of the monthly falls are of phenomenal magnitude. At Port Hastings, 13.95 in. fell; at Sydney, 10.36 in.; at Halifax, 9.62 in.; at White Head, 8.74 in.; at St. John, Newfoundland, 10.85 in.; at Bermuda, 9.42 in.; at Georgetown, P. E. I., 7.49 in.; at Grand Manan, 8.90 in.; Point Lepreaux, 7.89 in.; Dorchester, 7.27 in.; Yarmouth, 7.49 in.

The general distribution is as follows :—

In BRITISH COLUMBIA the rainfall was 3.00 in., or 0.34 above the average.

In the NORTH-WEST TERRITORIES it was 0.90 in., or 1.09 in. below the fall in 1890.

In MANITOBA it was 1.10 in., or 0.08 above the average.

In ONTARIO, West and South-West District it was 2.56 in.; or 0.31 in. below the average. In the North and North-West District it was 2.32 in., or 1.14 in. below the average. In the Central District it was 1.63 in. or 0.76 in. below the average; and in the East and North-East Districts it was 1.85 in., or 1.22 in. below the average.

In QUEBEC it was 2.93 in. or 0.47 in. below the average.

In NEW BRUNSWICK it was 5.81 in., or 1.91 in. above the average.

In NOVA SCOTIA it was 7.91 in., or 3.68 in. above the average.

In PRINCE EDWARD ISLAND it was 6.45 in., or 2.24 in. above the average.

Rainfall 5 in. and upwards during month :—

BRITISH COLUMBIA—Agassiz, 6.51 in.; Abbotsford, 5.28 in.

QUEBEC—Grindstone, 7.65 in.

NEW BRUNSWICK—St. John, 6.85 in.; Grand Manan, 8.90 in.; Point Escuminac 5.06 in.; Point Lepreaux, 7.89 in.

NOVA SCOTIA—Sable Island, 6.98 in.; White Head, 8.74 in.; Pictou, 6.19 in.; Halifax, 9.62 in.; Port Hastings, 13.95 in.; Truro, 6.33 in.; Sydney, 10.25 in.; Yarmouth, 7.49 in.

NEWFOUNDLAND—St. John, 10.85 in.

BERMUDA, 9.42 in.

PRINCE EDWARD ISLAND—Georgetown, 7.26 in.

Rainfall 1 inch and upwards in 24 hours :

1st, Little Forks, 1.00 in.; Gretna, 1.70 in.; Foxton, 1.00 in.; Barclay, 1.80 in.

2nd, Rathwell, 1.03 in.; Roseberry, 2.01 in.; Heron Bay, 1.25 in.; Barclay, 1.70 in.

4th, Midland, 1.24 in.; Novar, 1.25 in.; Sprucedale, 1.31 in.; Egremont, 1.10 in.; Beatrice, 1.35 in.

5th, Truro, 1.50 in.; Sydney, 1.81 in.; Yarmouth, 1.04 in.; Point des Monts, 1.20 in.; Georgetown, 1.51 in.; Port Hastings, 1.00 in.; Whiteside, 1.05 in.

6th, Halifax, 2.33 in.; Grindstone Island, 1.17 in.; Cow Bay, 1.62 in.; Port Hastings, 1.00 in.

7th, Whitehead, 1.74 in.

8th, Fredericton, 1.58 in.; St. John, 1.01 in.; Halifax, 1.25 in.; St. Andrews, 1.03 in.; Father Point, 1.10 in.; Grand Manan, 2.05 in.; Yarmouth, 2.04 in.; Point Escuminac, 1.26 in.; Kilmahumaig, 1.82 in.; Point Lepreaux, 2.10 in.; Port Hastings, 1.00 in.; Oliver's Ferry, 1.03 in.

9th, Grindstone Island, 1.24 in.; Sable Island, 2.51 in.

14th, Sydney, 1.06 in.; Halifax, 1.26 in.; St. Andrews, 1.25 in.; Grand Manan, 1.67 in.; Yarmouth, 1.24 in.; Warton, 1.61 in.; Point Lepreaux, 1.95 in.; Port Hastings, 2.00 in.

15th, Whitehead, 1'14 in.
 16th, Port Hastings, 1'40 in.
 17th, Bermuda, 5'94 in. ; Port Arthur, 1'17 in.
 18th, Wilton Grove, 1'65 in. ; Coldstream, 1'26 in. ; Heron Bay, 1'00 in.
 19th, London, 1'21 in. ; Dealtown, 1'09 in. ; Sable Island, 1'35 in. ; Port Hastings, 1'45 in. ; Point Clark, 1'36 in. ; Stoney Creek, 1'35 in.
 20th, Sydney, 1'88 in. ; St. John, Nfld., 1'70 in. ; Lyons, 1'47 in. ; Whitehead, 1'57 in.
 21st, St. John, Nfld., 1'96 in. ; Point des Monts, 1'60 in. ; Port Hastings, 1'80 in.
 22nd, Digby, 2'01 in. ; Whitehead, 1'34 in.
 23rd, Sydney, 1'24 in. ; St. John, 1'32 in. ; Halifax, 1'69 in. ; Grand Manan, 1'82 in. ; Point Escuminac, 1'46 in. ; Pictou, 1'17 in. ; Point Lepreaux, 1'70 in. ; Hastings, 2'00.
 24th, Grindstone Island, 1'56 in. ; St. John, Nfld., 1'08 in.
 26th, Alexandria, 1'25 in. ; Halifax, 1'04 in.
 27th, Bathurst, 1'50 in. ; Pictou, 1'00 in.
 28th, Digby, 1'00 in. ; Quamichan, 1'01.
 31st, St. Hyacinthe, 1'00 in.

SNOWFALL.—A considerable amount of snow has fallen at various stations throughout the Dominion ; in some instances as early as the beginning of the month, and at many stations in the North West Territories and Manitoba heavy snow was general on the 30th and 31st. This was preceded by several days of warm, fine weather, the thermometer having read upwards of 90° in the shade. On the 29th at Roseberry Mr. Stack reports that it was 98° in the shade, followed on the 30th by a fierce storm from the N. and N W., with snow.

Snow 3 in. and upwards in Month.

N. W. TERRITORIES—Swift Current, 18 in. ; Prince Albert, 4. in. ; Regina, 3 in. ; Chaplin, 9 in. ; Glen Adelaide, 16 in. ; Lethbridge, 7'5 in.

MANITOBA—Shoal Lake, 12 in. ; Hartney, 8 in. ; Rapid City, 5 in. ; Brandon, 6 in. ; Russell, 7 in. ; Hillview, 4 in. ; Elkhorn, 10 in. ; St. Albans, 4'5 in. ; Gladstone, 5 in. ; Rathwell, 3'2 in. ; Sunnyside, 5 in. ; Selkirk, 3 in. ; Craigilea, 3'5 in. ; Clandeboye, 3 in. ; Cartwright, 4 in. ; Roseberry, 4'5 in.

QUEBEC—Quebec, 3'5 in. ; Cape Magdalen, 10 in. ; Point des Monts, 7 in. ; Bicquet, 4 in. ; Chicoutimi, 3 in.

N. BRUNSWICK—Chatham, 7'8 in.

P. E. ISLAND—Charlottetown, 6 in.

Snow fall 3 in. and upwards in 24 hours.

2nd, Elkhorn, 8 in. ; Glen Adelaide, 7'5 in. ; Shoal Lake, 12 in. ; Hillview, 3 in. ; Rapid City, 3 in.
 3rd, Glen Adelaide, 3'5 in.

12th, Swift Current, 6 in. ; Lethbridge, 6 in.

13th, Swift Current, 6 in.

24th, Cape Magdalen, 3 in. ; Point des Monts, 3 in.

30th, Cartwright, 4 in. ; Roseberry, 4'5 in. ; Brandon, 4'0 in. ; Hartney, 4 in.

31st, Glen Adelaide, 5 in. ; Sunnyside, 5 in. ; Gladstone, 3 in. ; Savanne, 3 in. ; Selkirk, 3 in. ; Craigilea, 3 in. ; Clandeboye, 3 in. ; Treherne, 3 in.

Thunder storms recorded on—

1st, Little Forks.
 2nd, Little Forks.
 7th, Sharon.
 9th, Banff.
 10th, Rapid City.
 13th, Blenheim, Rapid City.
 14th, Cayuga, Cowal, Ridgetown.
 15th, Deseronto.
 16th, Deseronto.
 24th, Port Moody.
 25th, Wyoming.
 26th, Sombra, *terrific*, Cowal, Blenheim, Toronto.
 27th, Alexandria.
 31st, Richmond, *terrific*, St. Hyacinthe.

Mr. Webber, of Richmond, says of the thunder storms on the 31st, that nothing like it was known for years.

Mr. O. Casavant, of St. Hyacinthe, also says it was a severe storm and very uncommon at this season in that district.

Aurora recorded on the following date—

- 1st, Truro, IV ; Sydney, III ; Prince Albert, III ; Uplands, Chicoutimi.
- 2nd, Prince Albert, III ; Elora, Dorchester, N.B. ;
- 3rd, Fredericton, IV ; Port Arthur, I ; Mattawa, Winnipeg, IV.
- 5th, Chicoutimi, Hillview, Winnipeg, IV.
- 6th, Little Forks, IV ; Father Point, II.
- 7th, Minnedosa, IV ; Dorchester, N.B., Chicoutimi, Russell, III ; Pembina Crossing, IV ; Winnipeg, IV.
- 8th, Alexandria, IV ; Swift Current, II ; Minnedosa, III ; Bognor, III ; Savanne, Georgetown, P.E.I., Hillview, Russell, III ; Port Ellice, II ; Posen, III ; Pembina Crossing, IV ; Winnipeg, IV.
- 9th, Alexandria, IV ; Truro, IV ; Fredericton, III ; Novar, IV ; Russell, II ; Fort Ellice, II ; Pembina Crossing, III ; Winnipeg, IV ; Toronto, IV.
- 10th, Sydney, IV ; Birnam, IV ; Savanne, Pembina Crossing, III ; Winnipeg, IV.
- 11th, Minnedosa, III.
- 12th, Father Point, IV ; Savanne, Point Escuminac, Pembina Crossing, IV.
- 13th, Sydney, IV.
- 14th, Pembina Crossing, IV.
- 16th, Little Forks, III ; Minnedosa, IV.
- 17th, Minnedosa, IV.
- 18th, Pembina Crossing, IV.
- 19th, Little Forks, II ; Prince Albert, III ; St. Albans, IV ;
- 20th, Pembina Crossing, III.
- 21st, Bognor, IV.
- 22nd, Fredericton, III ; Elora, Gladstone.
- 23rd, Alexandria, IV ; Prince Albert, III ; Gravenhurst, II ; Zurich, Clontarf, IV ; Elora, Pembina Crossing, III.
- 24th, Alexandria, IV ; Gravenhurst, IV ; Savanne, Novar, IV ; Chicoutimi, St. Albans, IV ; Elkhorn, Russell, III ; Posen, II ; Pembina Crossing, II ; Winnipeg, IV ; Toronto, III.
- 25th, Truro, III ; Fredericton, IV ; Prince Albert, III ; Father Point, IV ; Savanne, Chicoutimi, III ; Sunnyside, I ; Posen, IV ; Winnipeg, IV ; Thedford, I.
- 26th, Novar, IV ; Sunnyside, II ; Posen, IV ; Winnipeg, IV.
- 27th, Gravenhurst, IV ; Zurich, Clontarf, IV ; Point Clark, II ; Novar, IV ; Elkhorn, Pembina Crossing, IV.
- 28th, Minnedosa, IV ; Savanne, Chicoutimi, IV ; Pembina Crossing, IV.
- 29th, Savanne, Pembina Crossing, IV.
- 30th, Dorchester, N.B.
- 31st, Pembina Crossing, IV.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE
THE HORIZON IN THE MONTH OF OCTOBER, 1891.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMALT.....			0 01	0 15	0 25	0 28	0 34	0 43	0 42	0 41	0 41	0 39	0 19			
AGASSIZ, B.C.				02	22	37	40	44	44	41	34	29	03			
INDIAN HEAD.....				01	28	38	41	41	42	41	39	35	12			
BRANDON.....				10	32	42	49	53	55	56	47	27	17			
WINNIPEG.....				27	52	49	55	54	56	51	51	48	25	07		
KINGSVILLE.....				26	50	50	63	60	62	61	58	50	10			
WOODSTOCK.....				22	47	61	57	61	55	57	52	41	11			
TORONTO.....			01	39	63	67	65	59	50	56	55	51	40	13		
LINDSAY.....			17	44	54	58	61	54	52	59	57	45	17	07		
BARRIE.....				22	54	51	58	54	49	53	52	53				
KINGSTON.....			03	31	48	58	68	65	61	59	52	48	33			
MONTREAL.....			16	34	45	47	44	41	46	52	47	40	18			
FREDERICTON.....			02	24	39	46	40	48	51	52	50	39	35	09		
SYDNEY.....			06	23	50	34	34	37	34	33	28	21	23	04		
MEAN PROPORTION FOR MONTH (Constant sunshine being 1.)	0 31	0 27	0 27	0 36	0 43	0 47	0 42	0 51	0 50	0 44	0 44	0 48	0 42	0 45	0 27	
MAXIMUM DAILY AMOUNT.....	0 88	0 71	0 77	0 85	0 92	0 81	0 87	0 92	95	0 87	0 83	0 94	0 95	0 86		
DATE.....	4	7	20	14	10	25	24	21	21	24	18	18	25	13		
NO. OF DAYS COMPLETELY CLOUDED.....	7	12	10	6	5	4	4	3	3	2	3	6	11	7		

PROBABILITIES.

The probabilities issued by this office at 11 p. m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a. m. the following day.

The number of predictions issued during the month was 641. These were divided as follows:

DISTRICT.	No. Issued.	V E R I F I E D.			Percentage.
		No. Fully.	No. Partly.	No. Not.	
MANITOBA.....	103	78	17	8	84.0
LOWER LAKE REGION.....	118	94	9	15	83.5
UPPER ST. LAWRENCE.....	107	81	14	12	82.2
LOWER ST. LAWRENCE.....	107	81	12	14	84.1
GULF.....	105	84	9	12	84.3
MARITIME PROVINCES.....	104	76	13	15	81.7
TOTAL.....	641	497	74	70	81.4

The percentage of verification is obtained by taking the sum of those fully verified and half the sum of those partly verified and dividing by the whole number.

In ascertaining the percentage of verification of the predictions the reports from the agents at the "Probability Stations," as well as the telegraphic reports, are used.

The daily probabilities and the storm warnings were issued by Probability Officer R. L. Stupart.

STORM WARNINGS.

During the month warnings on the approach of twelve storms were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 319, of which 295, or 92.5 per cent., were verified. At 16 stations, however, the force exceeded and at 14 did not reach that indicated by the signals displayed; thirty stations reported warnings received too late, owing to delay in issue and transmission. One station reported a storm for which no warning was sent.

In connection with the warnings, predictions as to probable directions of the wind were given, and of the 295 warnings verified as to force 257, or 87.1 per cent., were fully verified, and 285, or 96.6 per cent., were fully and partially verified.

No. 1. At 9.50 p.m. on the 1st, in advance of a disturbance then central over Kansas, Lake Superior was warned for a heavy E. through N. to N.W. storm. Port Arthur reports that vessels afterwards arriving experienced a heavy storm on Lake Superior. Signals were lowered on the night of the 3rd.

No. 2. All Lakes, except Superior, were warned for a moderate S.W. to N.W. storm at 10.05 a.m. on the 4th, a depression, which was increasing in energy, being situated over the Lake Region. A moderate gale is reported to have occurred during the same evening and early on the 5th, at Tobermory, Midland, Kincardine, Goderich, Pelee Island, Port Burwell and Port Dalhousie. Signals were lowered on the night of the 5th.

No. 3. All stations from Father Point east, were warned at 10.40 a.m. on the 5th, for a heavy easterly gale, in advance of an important disturbance passing up the Atlantic. During the same night and early on the 6th, the storm was very generally experienced, except in the Bay of Fundy, where strong winds only appear to have occurred. Percé, Canso and Ingonish report a fresh gale, and Sydney and Port Hastings a heavy gale. Signals were lowered on the morning of the 6th.

No. 4. Cautionary cones for a moderate E. through N. to N.W. gale were ordered for Lakes Erie and Ontario at 11 a.m. on the 7th. The same afternoon a moderate storm prevailed on Lake Ontario, but apparently not on Lake Erie. Signals were lowered at 10.20 a.m. on the 8th.

No. 5. Lawrence and Ocean stations were warned between 10.40 p.m. of the 7th and 10 a.m. of the 8th, for a moderate E. through S. to S.W. storm, on the approach of a disturbance of importance which was moving up the coast from the Gulf of Mexico. The storm subsequently prevailed over the districts warned during the afternoon of the 8th, and in many places it was severely felt, especially at Sydney, Cow Bay, Digby, St. John, Percé and Ingonish, where a fresh to heavy gale is reported to have occurred. Signals were lowered at 10.20 p.m. on the 9th.

No. 6. Cautionary cone No. 1 was displayed on the Georgian Bay during the 11th, on Lake Huron No. 2 was displayed on the 14th and 15th, and on Lake Superior cautionary signals were displayed at Port Arthur on the 12th, 13th and 14th, and at Sault Ste. Marie on the 14th. The display of these several signals was occasioned by the movement of more than one depression taken in conjunction with a high pressure area, and subsequently dangerous winds prevailed in all localities notified except at Port Arthur. On the 11th Presqu'Isle on the Georgian Bay recorded 35 miles an hour from the eastward. On the 14th Sault Ste. Marie felt a moderate gale, and on the 15th Goderich recorded 14 miles an hour from the westward and Port Burwell a moderate gale.

No. 7. Lawrence and Breton stations were warned for a heavy easterly gale at 10.20 a.m. on the 14th, an important disturbance being situated off the New England coast. The gale had already set in at some places before the warning arrived, but in most localities it was not severely felt until the evening of the 14th, when a fresh to heavy storm from N.E. and S.E. prevailed generally. Signals were lowered between the night of the 14th, and the morning of the 15th.

No. 8. Cautionary cone No. 2 for a moderate S.W. to N.W. storm was hoisted at all Lake stations at 10 p.m. on the 17th, on account of a moderate depression which was situated over Lake Superior. During the 18th, a moderate gale prevailed at Port Arthur, Sault Ste. Marie, Presqu'Isle, Pelee Island, and Port Burwell, also on the eastern portion of Lake Ontario, at Trenton and Trinyer. Signals were lowered during the 18th.

No. 9. Cautionary cones for a moderate easterly gale were ordered at 10.20 a.m. on the 19th for Gull and Ocean station. These cones were changed to storm signals the same afternoon, and on the morning of the 20th the storm signals were further extended to the River and Bay stations. The display of these signals was occasioned by the movement up the Atlantic some distance off the American coast of an important disturbance, which was immediately followed by a rapidly

METEOROLOGICAL SERVICE, DOMINION OF CANADA.

Monthly Weather Review.

NOVEMBER, 1891.

INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraphic reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

ATMOSPHERIC PRESSURE.

The average pressure, as determined from the observations taken at telegraph reporting stations, was above the normal of seventeen years in the greater part of Ontario and in Quebec and the Maritime Provinces. In Manitoba and the North-West Territories it was slightly below the normal.

The 1st was marked by an important high pressure area covering the country from British Columbia to the Lake Region, and by a deep depression situated in the Lower St. Lawrence Valley and the Gulf. Cold weather prevailed from the Rockies to the Upper Lake Region, with light snowfalls in many places; thence to the Atlantic it was unsettled, with local showers of rain or sleet, attended by strong west to north-west winds on the Lakes, and by a gale from the same directions in the Lower St. Lawrence and the Gulf as well as in portions of the Maritime Provinces.

2nd-6th. During this interval, owing to the presence of the high area, the distribution of pressure was anti-cyclonic from the Upper Lakes to the Atlantic, interrupted, however, on the night of the 4th, in the Lake Region, by the passage of a slight depression. The weather was everywhere fine except that during the evening and night of the 4th a light fall of rain or snow occurred over the Lake Region. Temperature varied generally between 20° and 40° , and the winds were as a rule moderate.

In the North-West Territories and Manitoba, for the same period, the distribution of pressure was mainly cyclonic, and the weather, with the exception of a few scattered showers, fine and mild.

A disturbance now skirted our Atlantic seaboard and several depressions passed up the Mississippi Valley from the Gulf of Mexico, and another series traversed the North-West Territories and Manitoba. The last and most severe of the system reached the Lake Region on the 10th and thence moved to the Atlantic. Frequent rains occurred in the Lake Region, the greatest amount falling on the 10th. Along the St. Lawrence and in the Gulf it only rained on the 11th and 12th, but in the Maritime Provinces it rained frequently, the heaviest falls happening on the 8th and 11th. In the North West Territories and Manitoba snow fell generally between the 9th and 12th. On the 10th and 11th a moderate to fresh gale was experienced on the Lakes, and between the 9th and 12th a west to north gale was general from the Rockies to Manitoba.

An area of high pressure, which first moved into the far North-West during the night of the 10th, now travelled slowly across Canada to the Atlantic, attaining its greatest height (30.70 inches) when central, on the 15th, in the St. Lawrence Valley. Its accompanying weather was, for the most part, fine, with a few snow flurries, and it gave sharp frosts generally, with minima below 20° in the Ottawa and St. Lawrence valleys, and from 0 to -10 in the North West.

As the high pressure area just mentioned passed eastwards, the weather from the Lakes to the Atlantic came under the influence of two low pressure areas, which followed one another in quick succession from the Southwest States. The first of these, with developing energy, travelled between the 15th and 16th over Lake Superior, uniting in its advance with a little depression which

had been in Manitoba ; thence it passed far north-northeastwards. The second one, after reaching the Lower Lakes on the night of the 16th, suddenly developed great energy, and on the 17th travelled the St. Lawrence Valley and the Maritime Provinces as an important storm. The first of these depressions gave heavy rains and moderate gales in the Lake Region ; the second one was accompanied by fresh to heavy gales and copious rains throughout its course.

In the North-West Territories and Manitoba another important anticyclone moved into the country, whilst the Southwest depressions were affecting other parts of Canada, and it was attended there by fine, cold weather, minima ranging between -4 and -18 occurring everywhere. It then travelled the continent to the Atlantic, its accompanying cold wave between the 17th and 19th being pretty generally experienced in Ontario, Quebec and the Maritime Provinces, when light snow fell in many localities, and minima occurred as low as 6° and 8° in the Ottawa Valley and the Parry Sound district, and of 10° and 18° respectively in the St. Lawrence Valley and on the Atlantic coast.

20th-28th. As the last-mentioned anticyclone passed to the Atlantic, the weather in Canada again came under the influence of a series of low-pressure areas, eight in number ; the last of these disappeared off the Atlantic coast on the 28th. The two most important of the system were a deep disturbance which between the 22nd and 24th passed from the Mississippi Valley over the St. Lawrence to the Gulf, and a disturbance which between the 24th and 25th traversed the North-West Territories, and on the 26th developed much more energy when over the Upper Lake Region. As a result of the movement of so many depressions, the weather was kept in a very unsettled state for the larger portion of this protracted interval, except, perhaps, in the Maritime Provinces, where, outside of rain on the 23rd and 27th, and snow and rain on the 24th and 28th, it was fair. In the North-West Territories, however, snow fell in many portions of the country on every day but the 27th and 28th, and in the Lake Region and over the greater part of the St. Lawrence Valley snow or rain chiefly the latter occurred daily, and as a rule in considerable quantities. Gales were experienced in the North-West Territories on the 20th and 26th, from the Lakes to the Atlantic on the 23rd and 24th, again on the Lakes on the 26th, and in the Gulf on the 27th. Temperature was low in the North-West, invariably at night, some degrees below zero, and on the 27th and 28th from -28 to -32 . From the Lakes to the Atlantic on the other hand, except on the 28th, it was often much above its average, and maxima from 56° to 60° occurred on the 23rd and 24th.

29th-30th. The distribution of pressure from the Lakes to the Atlantic on these two days was entirely anticyclonic, the weather was generally fine, although a few scattered light local snowfalls or snow flurries occurred, and the temperature was below its average, minima being reported ranging from -4 to 12 in the Lake Region, from -8 to zero along the St. Lawrence, and within a few degrees of zero in the Maritime Provinces.

In the North-West Territories and Manitoba, at the same time, the distribution of pressure was cyclonic, and the weather fine and mild.

TEMPERATURE.

The average temperature, as determined from the observations taken at telegraph reporting stations, was above the normal of seventeen years in the greater part of Ontario and in Quebec and the Maritime Provinces. In Manitoba and the North-West Territories it was about 5° below the normal.

The highest and lowest temperatures in each Province during November were :

British Columbia, $66^{\circ}0$ on 4th, at Barkerville ; $-6^{\circ}0$ on 15th, at Barkerville.

N. W. Territories, $65^{\circ}0$ on 9th, at Chaplin ; $-29^{\circ}5$ on 27th, at Prince Albert.

Manitoba, $64^{\circ}1$ on 6th, at Gladstone ; $-33^{\circ}5$ on 28th, at Russell.

Ontario, $70^{\circ}0$ on 10th, at Stoney Creek ; $-39^{\circ}0$ on 28th, at Ignace.

Quebec, $65^{\circ}0$ on 17th, at Cape Magdalene ; $-11^{\circ}5$ on 30th, at Richmond.

New Brunswick, $67^{\circ}0$ on 12th, at Bathurst ; $-1^{\circ}5$ on 30th, at Chatham.

Nova Scotia, $65^{\circ}6$ on 11th, at Yarmouth ; $9^{\circ}0$ on 30th, at Truro.

P. E. Island, $64^{\circ}0$ on 12th, at Georgetown ; $9^{\circ}4$ on 29th, at Kilmahumraig.

At Esquimalt, B., C. shock of earthquake at 3.30 p.m. of 29th.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, NOVEMBER, 1891.

	PRESSURE IN INCHES.				TEMPERATURE OF AIR.				DIRECTION OF WIND FROM										VELOCITY OF WIND.				PRECIPITATION.				No. of Thunderstorms.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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PRESSURE, TEMPERATURE, WIND AND PRECIPITATION, &c.—Continued.

	PRESSURE IN INCHES.				TEMPERATURE OF AIR.				DIRECTION OF WIND FROM												VELOCITY OF WIND.				PRECIPITATION.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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Sydney.....	30-69-74	29-32	1-41	2-8-4	2-00	21-00-0	12	19-0	3	13-3	25-5	8-4	23	2	6	69	21	22	17	180	9-4	21-0	17-2W	1-35	3-12	13	17	2	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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Kilmahoney	1961	1981	1991	2001	2011	2021	2031	2041	2051	2061	2071	2081	2091	2101	2111	2121	2131	2141	2151	2161	2171	2181	2191	2201	2211	2221	2231	2241	2251	2261	2271	2281	2291	2301	2311	2321	2331	2341	2351	2361	2371	2381	2391	2401	2411	2421	2431	2441	2451	2461	2471	2481	2491	2501	2511	2521	2531	2541	2551	2561	2571	2581	2591	2601	2611	2621	2631	2641	2651	2661	2671	2681	2691	2701	2711	2721	2731	2741	2751	2761	2771	2781	2791	2801	2811	2821	2831	2841	2851	2861	2871	2881	2891	2901	2911	2921	2931	2941	2951	2961	2971	2981	2991	3001	3011	3021	3031	3041	3051	3061	3071	3081	3091	3101	3111	3121	3131	3141	3151	3161	3171	3181	3191	3201	3211	3221	3231	3241	3251	3261	3271	3281	3291	3301	3311	3321	3331	3341	3351	3361	3371	3381	3391	3401	3411	3421	3431	3441	3451	3461	3471	3481	3491	3501	3511	3521	3531	3541	3551	3561	3571	3581	3591	3601	3611	3621	3631	3641	3651	3661	3671	3681	3691	3701	3711	3721	3731	3741	3751	3761	3771	3781	3791	3801	3811	3821	3831	3841	3851	3861	3871	3881	3891	3901	3911	3921	3931	3941	3951	3961	3971	3981	3991	4001	4011	4021	4031	4041	4051	4061	4071	4081	4091	4101	4111	4121	4131	4141	4151	4161	4171	4181	4191	4201	4211	4221	4231	4241	4251	4261	4271	4281	4291	4301	4311	4321	4331	4341	4351	4361	4371	4381	4391	4401	4411	4421	4431	4441	4451	4461	4471	4481	4491	4501	4511	4521	4531	4541	4551	4561	4571	4581	4591	4601	4611	4621	4631	4641	4651	4661	4671	4681	4691	4701	4711	4721	4731	4741	4751	4761	4771	4781	4791	4801	4811	4821	4831	4841	4851	4861	4871	4881	4891	4901	4911	4921	4931	4941	4951	4961	4971	4981	4991	5001	5011	5021	5031	5041	5051	5061	5071	5081	5091	5101	5111	5121	5131	5141	5151	5161	5171	5181	5191	5201	5211	5221	5231	5241	5251	5261	5271	5281	5291	5301	5311	5321	5331	5341	5351	5361	5371	5381	5391	5401	5411	5421	5431	5441	5451	5461	5471	5481	5491	5501	5511	5521	5531	5541	5551	5561	5571	5581	5591	5601	5611	5621	5631	5641	5651	5661	5671	5681	5691	5701	5711	5721	5731	5741	5751	5761	5771	5781	5791	5801	5811	5821	5831	5841	5851	5861	5871	5881	5891	5901	5911	5921	5931	5941	5951	5961	5971	5981	5991	6001	6011	6021	6031	6041	6051	6061	6071	6081	6091	6101	6111	6121	6131	6141	6151	6161	6171	6181	6191	6201	6211	6221	6231	6241	6251	6261	6271	6281	6291	6301	6311	6321	6331	6341	6351	6361	6371	6381	6391	6401	6411	6421	6431	6441	6451	6461	6471	6481	6491	6501	6511	6521	6531	6541	6551	6561	6571	6581	6591	6601	6611	6621	6631	6641	6651	6661	6671	6681	6691	6701	6711	6721	6731	6741	6751	6761	6771	6781	6791	6801	6811	6821	6831	6841	6851	6861	6871	6881	6891	6901	6911	6921	6931	6941	6951	6961	6971	6981	6991	7001	7011	7021	7031	7041	7051	7061	7071	7081	7091	7101	7111	7121	7131	7141	7151	7161	7171	7181	7191	7201	7211	7221	7231	7241	7251	7261	7271	7281	7291	7301	7311	7321	7331	7341	7351	7361	7371	7381	7391	7401	7411	7421	7431	7441	7451	7461	7471	7481	7491	7501	7511	7521	7531	7541	7551	7561	7571	7581	7591	7601	7611	7621	7631	7641	7651	7661	7671	7681	7691	7701	7711	7721	7731	7741	7751	7761	7771	7781	7791	7801	7811	7821	7831	7841	7851	7861	7871	7881	7891	7901	7911	7921	7931	7941	7951	7961	7971	7981	7991	8001	8011	8021	8031	8041	8051	8061	8071	8081	8091	8101	8111	8121	8131	8141	8151	8161	8171	8181	8191	8201	8211	8221	8231	8241	8251	8261	8271	8281	8291	8301	8311	8321	8331	8341	8351	8361	8371	8381	8391	8401	8411	8421	8431	8441	8451	8461	8471	8481	8491	8501	8511	8521	8531	8541	8551	8561	8571	8581	8591	8601	8611	8621	8631	8641	8651	8661	8671	8681	8691	8701	8711	8721	8731	8741	8751	8761	8771	8781	8791	8801	8811	8821	8831	8841	8851	8861	8871	8881	8891	8901	8911	8921	8931	8941	8951	8961	8971	8981	8991	9001	9011	9021	9031	9041	9051	9061	9071	9081	9091	9101	9111	9121	9131	9141	9151	9161	9171	9181	9191	9201	9211	9221	9231	9241	9251	9261	9271	9281	9291	9301	9311	9321	9331	9341	9351	9361	9371	9381	9391	9401	9411	9421	9431	9441	9451	9461	9471	9481	9491	9501	9511	9521	9531	9541	9551	9561	9571	9581	9591	9601	9611	9621	9631	9641	9651	9661	9671	9681	9691	9701	9711	9721	9731	9741	9751	9761	9771	9781	9791	9801	9811	9821	9831	9841	9851	9861	9871	9881	9891	9901	9911	9921	9931	9941	9951	9961	9971	9981	9991	10001	10011	10021	10031	10041	10051	10061	10071	10081	10091	10101	10111	10121	10131	10141	10151	10161	10171	10181	10191	10201	10211	10221	10231	10241	10251	10261	10271	10281	10291	10301	10311	10321	10331	10341	10351	10361	10371	10381	10391	10401	10411	10421	10431	10441	10451	10461	10471	10481	10491	10501	10511	10521	10531	10541	10551	10561	10571	10581	10591	10601	10611	10621	10631	10641	10651	10661	10671	10681	10691	10701	10711	10721	10731	10741	10751	10761	10771	10781	10791	10801	10811	10821	10831	10841	10851	10861	10871	10881	10891	10901	10911	10921	10931	10941	10951	10961	10971	10981	10991	11001	11011	11021	11031	11041	11051	11061	11071	11081	11091	11101	11111	11121	11131	11141	11151	11161	11171	11181	11191	11201	11211	11221	11231	11241	11251	11261	11271	11281	11291	11301	11311	11321	11331	11341	11351	11361	11371	11381	11391	11401	11411	11421	11431	11441	11451	11461	11471	11481	11491	11501	11511	11521	11531	11541	11551	11561	11571	11581	11591	11601	11611	11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PRECIPITATION.

The rainfall in Ontario and British Columbia has exceeded the average by a large amount in all the other Provinces the amount has fallen far below the average.

The general distribution is as follows :—

In BRITISH COLUMBIA the rainfall was 5'55 in., or 2'06 above the average.

In the NORTH-WEST TERRITORIES the rainfall was 0'07 in., or about the average quantity.

In MANITOBA the rainfall was slight, a measurable quantity only being recorded at one station (Treherne).

In ONTARIO, West and South-West District it was 4'47 in., or 2'30 in., above the average. In the North and North-West district it was 4'40 in., or 2'54 in. above the average. In the Central District it was 3'84 in. or 1'92 in. above the average; and in the East and North-East District it was 2'93 in., or 1'13 in. above the average.

In QUEBEC it was 1'63 in. or 0'07 in. below the average.

In NEW BRUNSWICK it was 1'90 in., or 1'35 in. below the average.

In NOVA SCOTIA it was 2'02 in., or 2'32 in. below the average.

In PRINCE EDWARD ISLAND it was 1'02 in., or 1'95 in. below the average.

Rainfall 5 in. and upwards during month :—

BRITISH COLUMBIA,—Port Moody 13'91 in.; Agassiz 12'77 in.; Abbotsford 10'53 in.; Quamichan 7'40 in.; Esquimalt 7'19 in.

ONTARIO,—Presque Isle, 7'40 in.; Lions Head, 6'48 in.; Thompson, 6'58 in. St. Thomas, 5'27 in.; Thedford, 5'69 in.; Burks Falls, 5'31 in.; Dealtown, 5'90 in.; Watford, 5'22 in.; Orangeville, 6'55 in.; Fergus, 5'80 in.; Blenheim, 5'96 in.; Coldstream, 6'74 in.; Cowal, 5'92 in.; Wiarton, 7'04 in.; Sunshine, 7'14 in.; Zurich, 8'26 in.; Ridgetown, 5'49 in.; Birnam, 5'86 in.; St. Mary's, 6'62 in.; Elora, 5'83 in.; Lucknow, 7'43 in.; Owen Sound, 5'57 in.; Sprucedale, 6'42 in.; Whiteside, 5'23 in.; Bognor, 6'13 in.; Collingwood, 5'31 in.; Cartier, 5'39 in.; Egremont, 5'10 in.; Beatrice, 6'05 in.; Point Clark, 6'45 in.; Sombra, 5'17 in.; Novar, 5'73 in.; Coldwater, 5'10 in.; London, 6'34 in.; Alton, 5'08 in.; Parry Sound, 6'13 in.; Saugeen, 5'30 in.; Woodstock, 5'62 in.

Rainfall 1 inch and upwards in 24 hours:

- 2nd, Quamichan, 1'40 in.
- 3rd, Abbotsford, 1'02 in.; Port Moody, 1'10 in.
- 4th, Agassiz, 1'33 in.; Port Moody, 1'25 in.
- 6th, Ignace, 1'10 in.
- 7th, Port Moody, 1'13 in.
- 8th, Abbotsford, 1'19 in.; Port Moody, 1'30 in.
- 9th, Goderich, 1'06 in.; Port Moody, 1'50 in.
- 10th, Sarnia, 1'00 in.; Wiarton, 1'00 in.; Cowal, 1'12 in.; Coldstream, 1'11 in.; Blenheim, 1'03 in.; Watford, 1'00 in.; Oil Springs, 1'20 in.; Thedford, 1'25 in.; St. Thomas, 1'16 in.; Huntsville, 1'15 in.; Wilton Grove, 1'54 in.; Ridgetown, 1'16 in.; Pelee Island, 2'00 in.; Birnam, 1'10 in.; Elora, 1'48 in.; Sprucedale, 1'55 in.; Cartier, 1'17 in.; Egremont, 1'32 in.; Point Clark, 1'41 in.; Sombra, 1'56 in.; Gravenhurst, 1'01 in.; Novar, 1'04 in.; London, 1'44 in.; Alton, 1'07 in.; Parry Sound, 1'12 in.; Woodstock, 1'31 in.
- 11th, Fergus, 1'46 in.; Orangeville, 1'10 in.; Burk's Falls, 1'35 in.; Thompson, 1'51 in.; Paris, 1'02 in.; Niagara Falls, S., 1'00 in.; Cartier, 1'98 in.; Sault Ste. Marie, 1'21 in.
- 14th, Glastonbury, 1'50 in.
- 15th, Wiarton, 1'37 in.
- 16th, Guelph, 1'10 in.; Coldwater, 1'10 in.; Alton, 1'12 in.; Parry Sound, 1'20 in.; Aurora, 1'21 in.; Thompson, 1'27 in.; Huntsville, 1'12 in.; Presque Isle, 1'40 in.; Zurich, 1'00 in.; Elora, 1'10 in.; Sprucedale, 1'50 in.; Point Clark, 1'26 in.; Gravenhurst, 1'00 in.; Novar, 1'18 in.
- 17th, Port Hope, 1'00 in.; Sharon, 1'08 in.
- 21st, Denbigh, 1'20 in.; Thompson, 1'07 in.; Niagara Falls, S., 1'00 in.; Elora, 1'60 in.; Port Moody, 1'02 in.
- 22nd, Sarnia, 1'04 in.; Princeton, 1'47 in.; Oil Springs, 1'20 in.; Aurora, 1'87 in.; Credit, 1'24 in.; Wilton Grove, 2'94 in.; Egremont, 1'27 in.; Gravenhurst, 1'03 in.; Quamichan, 1'30 in.; Port Moody, 1'12 in.

- 23rd, Mount Forest, 113 in.; Wiarton, 207 in.; Cowal, 208 in.; Coldstream, 273 in.; Blenheim, 309 in.; Nelson, 156 in.; Fergus, 201 in.; Orangeville, 179 in.; Roschill, 138 in.; Wyoming, 213 in.; Watford, 177 in.; Dealtown, 251 in.; Thedford, 108 in.; St. Thomas, 155 in.; Midland, 110 in.; Lion's Head, 205 in.; Presque Isle, 300 in.; Goderich, 140 in.; Zurich, 208 in.; Kingsville, 116 in.; Ridgetown, 239 in.; Birnam, 143 in.; St. Mary's, 180 in.; Cottam, 109 in.; Sprucedale, 290 in.; Bognor, 195 in.; Collingwood, 153 in.; Egremont, 111 in.; Point Clark, 248 in.; Sombra, 122 in.; Novar, 110 in.; Guelph, 101 in.; Coldwater, 106 in.; London, 203 in.; Zurich, 208 in.; Port Stanley, 158 in.; Saugeen, 170 in.; Rockliffe, 112 in.; Woodstock, 152 in.
- 24th, Sunshine, 240 in.; Thedford, 154 in.; Niagara Falls, S., 124 in.; Lucknow, 274 in.; Owen Sound, 303 in.; Uplands, 135 in.; North Bruce, 265 in.; Abbotsford, 109 in.; St. John's, N.F.L., 100 in.
- 25th, Glastonbury, 115 in.; Quamichan, 120 in.
- 26th, Orangeville, 101 in.; Port Moody, 108 in.
- 27th, Zurich, 100 in.; Cow Bay, 112 in.; St. Andrews, 195 in.
- 28th, St. Mary's, 180 in.
- 30th, Abbotsford, 100 in.; Port Moody, 117 in.

The Snowfall in the Eastern Provinces has been considerably less than the average quantity for November, while in Manitoba and westward to British Columbia the fall has been large and general; in Manitoba some observers report the largest fall for November during several years.

The distribution is as follows:

BRITISH COLUMBIA.—On the coast only a small quantity has fallen, but in the interior upwards of three feet is recorded.

In N. W. TERRITORIES about 7 in. has fallen.

In MANITOBA 11.6 in. has fallen, or about three times the average.

In the districts of ONTARIO the amount is 8.2 in., or 0.5 in. below the average; 11.5 in., or 3.4 in. below the average; 5.0 in., or 1.1 in. below the average; 4.9 in., or 3.3 in. below the average.

In QUEBEC 5.5 in., or 6.7 in. below the average.

In NEW BRUNSWICK 2.3 in., or 6.3 in. below the average.

In NOVA SCOTIA 2.4 in., or 1.8 in. below the average.

In P. E. ISLAND 4.0 in., or 4.3 in. below the average.

Monthly Snowfall 6 in. and upwards.

BRITISH COLUMBIA.—Baskerville, 36 in.

N. W. TERRITORIES.—Glen Adelaide, 12 in.; Maple Creek, 11 in.; Swift Current, 12 in.; Qu'Appelle, 9 in.

MANITOBA.—Hartney, 15 in.; Cartwright, 12 in.; Foxton, 9 in.; Gladstone, 8 in.; Rathwell, 6 in.; Brandon, 9 in.; Fort Ellice, 7 in.; Brandon (Experimental Farm), 6 in.; Oakbank, 17 in.; Russell, 8 in.; Norquay, 13 in.; Portage la Prairie, 9 in.; Shoal Lake, 9 in.; Hillview, 7 in.; Clandeboye, 11 in.; Elkhorn, 11 in.; Winnipeg, 12 in.; Clarkeleigh, 14 in.; Killarney, 12 in.; Cartwright, (2) 15 in.; Belmont, 16 in.; Roseberry, 22 in.

ONTARIO. Presque Isle, 13 in.; Axe Lake, 17 in.; Huntsville, 12 in.; Owen Sound, 11 in.; Uplands, 11 in.; Denbigh, 7 in.; Midland, 6 in.; Joly, 15 in.; Thedford, 7 in.; Savanne, 6 in.; Burk's Falls, 9 in.; Heron Bay, 12 in.; Winona, 7 in.; Buda, 9 in.; Dealtown, 7 in.; Bognor, 22 in.; Oil Springs, 6 in.; Whiteside, 14 in.; Orillia, 14 in.; Sprucedale, 19 in.; Wyoming, 7 in.; St. Mary's, 10 in.; Fergus, 8 in.; Lucknow, 13 in.; Nelson, 7 in.; Egremont, 17 in.; Sarnia, 14 in.; Cayuga, 6 in.; Princeton, 9 in.; Wiarton, 6 in.; Mount Forest, 21 in.; Sunshine, 14 in.; Kingsville, 7 in.; Ridgetown, 7 in.; Niagara Falls S., 6 in.; Sharon, 7 in.; De Cewsville, 7 in.; Cottam, 8 in.; Cartier, 32 in.; Missanabic, 32 in.; Norwood, 8 in.; Beatrice, 12 in.; Point Clark, 13 in.; Sombra, 8 in.; Sault Ste. Marie, 16 in.; Gravenhurst, 11 in.; Novar, 19 in.; Bancroft, 8 in.; Guelph, 6 in.; Coldwater, 19 in.; Little Forks, 8 in.; Alton, 7 in.; Parry Sound, 18 in.; Saugeen, 18 in.; Rockliffe, 7 in.; White River, 6 in.; Woodstock, 11 in.; Lindsay, 10 in.

QUEBEC.—St. Hyacinthe, 6 in.; Point des Monts, 15 in.; Bicquet, 9 in.; Grindstone, 9 in.

Snowfall 4 in. and upwards in 24 hours.

2nd, Fort Ellice, 5 in.

3rd, Grindstone, 4 in.

7th, White River, 4 in.

10th, Hartney, 5 in.; Rosebury, 12 in.; Cartwright 6 in.

11th, Rosebury, 4 in. ; Portage la Prairie, 4 in. ; Maple Creek, 6 in.
 12th, Heron Bay, 6 in.
 14th, Sault st. Marie, 5 in.
 15th, Clarkleigh, 4 in. ; Clandeboye, 4 in. ; Oakbank, 4 in. ; Portage la Prairie, 4 in. ; Savanne, 4 in.
 17th, Roseberry, 6 in. ; Orillia, 4 in. ; Fergus, 5 in. ; Mount Forest, 11 in. ; Bognor 6 in. ; Buda, 5 in. ; Coldwater, 5 in.
 18th, Presque Isle, 4 in. ; St. Mary's 4 in. ; Owen Sound, 5 in. ; Egremont, 5 in. ; Barkerville, 5 in. ; Lindsay 4 in.
 19th, Barkerville, 5 in.
 20th, Clandeboye, 4 in.
 21st, Hillview, 6 in. ; Shoal Lake, 4 in. ; Oakbank, 5 in. ; Swift Current, 4 in.
 22nd, Barkerville, 5 in.
 23rd, Norquay, 6 in. ; Oakbank, 5 in.
 24th, Cartier, 15 in. ; Missanabie, 4 in. ; Egremont, 4 in. ; Beatrice, 4 in.
 25th, Clarkleigh, 4 in. ; Presque Isle, 4 in. ; Huntsville, 9 in. ; Mount Forest, 4 in. ; Bognor, 4 in. ; Axe Lake, 12 in. ; Joly, 4 in. ; Novar, 8 in. ; Parry Sound, 10 in. ; Rockliffe, 5 in.
 26th, Whiteside, 5 in. ; Cartier, 12 in. ; Missanabie, 8 in. ; Gravenhurst, 5 in.
 27th, Wilton Grove, 4 in. ; St. Thomas, 4 in. ; Oil Springs, 5 in. ; Nelson 7 in. ; Cayuga, 5 in. ; Cowal, 4 in. ; Princetown, 6 in. ; Sarnia, 6 in. ; Kingsville, 5 in. ; Ridgetown, 5 in. ; Missanabie, 6 in. ; Norwood, 5 in. ; Sombra, 7 in. ; Point des Monts, 13 in. ; Alton, 4 in. ; Woodstock, 4 in.
 28th, Thedford, 4 in. ; Winona, 5 in. ; Dealtown, 6 in. ; Wyoming, 7 in. ; Blenheim, 5 in. ; Zurich, 4 in. ; Paris, 4 in. ; Niagara, Falls, S., 5 in. ; Decewsville 6 in. ; Cottam, 8 in. ; Stoney Creek, 4 in. ; Brantford, 5 in. ; Missanabie, 5 in. ; Point Clark, 13 in. ; Paris, 5 in. ; Zurich, 4 in.
 29th, Sarnia, 8 in. ; Missanabie, 4 in. ; Saugeen, 4 in.
 30th, Missanabie, 5 in. ; Barkerville, 5 in.

Thunder or lightning recorded on—

1st, Brome.
 8th, St. Thomas, Blenheim, Ridgetown, Pelee Island, Lucknow.
 25th, Gravenhurst.
 27th, Stony Creek.

Aurora recorded on—

Where the class of aurora is noted by the observer it is given (I), being the brightest (IV), the feeblest in brilliancy.

2nd, Father Point, III ; Truro, IV.
 3rd, Posen, II.
 4th, Dorchester (N.B.), Little Forks, III ; Truro, IV.
 5th, Posen, IV ; Dorchester (N.B.), Georgetown (P.E.I.), Prince Albert, III ; Father Point, IV ; Sydney, IV.
 6th, Pembina Crossing, III ; Hillview, Posen, IV ; Russell, III ; Portage la Prairie, St. Albans, III ; Gladstone, Elkhorn, Dorchester (N.B.), Georgetown (P.E.I.), Truro, IV.
 7th, Posen, II ; Dorchester (N.B.), Minnedosa, III.
 8th, Pembina Crossing, IV.
 14th, Port Arthur, III ; Prince Albert, III.
 18th, Pembina Crossing, IV.
 19th, Pembina Crossing, IV ; Posen, IV ; Yarmouth, IV.
 20th, Sydney, III.
 21st, Dorchester (N.B.).
 22nd, Truro, IV.
 24th, Bancroft, IV.
 25th, Minnedosa, IV.
 26th, Minnedosa, IV.
 27th, St. Albans, IV ; Port Arthur, III.
 28th, Port Arthur, III ; Minnedosa, IV.
 30th, Russell, II.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE
THE HORIZON IN THE MONTH OF NOVEMBER, 1891.

	HOURS ENDING															
	5	6	7	8	9	10	11	NOON	1	2	3	4	5	6	7	8
	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.		P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.
ESQUIMALT.....	..	..	..	0 00	0 08	0 12	0 25	0 33	0 27	0 26	0 26	0 06	..	..	..	..
AGASSIZ, B.C.....	..	..	..	00	06	15	14	17	17	15	14	11	8	..	..	..
BRANDON.....	..	..	..	00	15	28	42	44	51	53	48	29	62	..	..	..
INDIAN HEAD.....	..	..	..	00	11	25	23	35	39	33	35	20	61	..	..	..
WINNIPEG.....	..	..	..	03	31	35	41	43	41	41	38	25	61	..	..	..
KINGSVILLE.....	..	..	..	06	19	28	40	36	27	28	30	18	61	..	..	..
WOODSTOCK.....	..	..	..	07	07	21	27	32	32	30	23	13	62	..	..	..
TORONTO.....	..	..	..	10	23	23	26	37	41	37	35	17	65	..	..	..
LINDSAY.....	..	..	..	09	14	24	31	24	23	27	28	19	60	..	..	..
BARRIE.....	..	..	..	00	10	18	19	28	24	22	18	12	61	..	..	..
KINGSTON.....	..	..	..	07	29	38	44	46	48	44	48	23	61	..	..	..
.....
MONTREAL.....	..	..	..	11	39	41	40	45	45	38	31	04	69	..	..	..
FREDERICTON.....	..	..	..	05	30	38	47	50	53	63	60	56	63	..	..	..
SYDNEY.....	..	..	..	10	29	34	32	36	43	45	42	33	69	..	..	..
<hr/>																
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)	0 17	0 12	0 34	0 24	0 33	0 23	0 20	0 27	0 21	0 16	0 36	0 36	0 44	0 33		
MAXIMUM DAILY AMOUNT.....	0 61	0 81	0 77	0 81	0 83	0 86	0 72	0 87	0 98	0 71	0 85	0 94	0 94	0 95		
DATE	7	10	19	6	6	30	30	2	29	11	29	15	19	21		
NO. OF DAYS COMPLETELY CLOUDED.....	13	19	7	12	10	12	11	7	12	12	6	11	10	9		

PROBABILITIES.

The probabilities issued by this office at 11 p. m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a. m. the following day.

The number of predictions issued during the month was 635. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			Percentage.
		No. Fully.	No. Partly.	No. Not.	
MANITOBA	91	69	13	9	83 0
LOWER LAKE REGION	114	93	16	5	88 6
UPPER ST. LAWRENCE	108	82	17	9	83 8
LOWER ST. LAWRENCE	101	81	11	9	85 6
GULF	109	92	12	5	89 9
MARITIME PROVINCES	112	81	16	12	82 1
TOTAL	635	501	85	49	85 6

The percentage of verification is obtained by taking the sum of those fully verified and half the sum of those partly verified and dividing by the whole number.

In ascertaining the percentage of verification of the predictions the reports from the agents at the "Probability Stations," as well as the telegraphic reports, are used.

The daily probabilities were issued by Probability Officer B. C. Webber.

STORM WARNINGS.

During the month warnings on the approach of five storms were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 260, of which 212, or 81·5 per cent., were verified. At 5 stations, however, the force did not reach that indicated by the signals displayed; 13 stations reported warnings received late, 8 owing to delay in issue, and 5 to delay in transmission, and 2 stations reported a storm for which no warning was sent.

In connection with the warnings, predictions as to probable directions of the wind were given, and of the 212 warnings verified as to force, 206, or 97·2 per cent., were fully verified, and 212, or 100 per cent., were fully and partially verified.

No. 1. At 10 a.m. on the 5th all Bay of Fundy stations, also Liverpool and Halifax, were warned for a moderate gale from the N., shifting to N. E. and E. in advance of a depression then covering the Middle Eastern States, which eventually passed off the coast, causing a gale on the New England coast, but no higher velocity than a strong N.-E. wind was reported from Canadian stations.

At 10 a.m. on the 7th, stations in the Gulf of St. Lawrence, south of Chatham, in the Bay of Fundy and along the Atlantic coast were warned for a strong N. E. to N. and N. W. gale, and at 10.40 a.m. on the same day all stations north of Chatham and on the River St. Lawrence were similarly warned, owing to the above depression showing signs of considerable development off the New England coast. During the night of the 7th and on the 8th, a moderate to fresh gale from the E. and N. E. was experienced along the Cape Breton and Atlantic coasts, and a strong N. E. gale was reported from the Bay of Fundy. No storm apparently occurred in the Gulf of St. Lawrence. By the night of the 8th the cyclone had passed out to sea.

No. 2. At 10 a.m. on the 8th all Lake stations were warned for a moderate gale from the S. to W. and N. W., in consequence of a trough of low pressure then extending from the Lakes to Mexico. Later a cyclone of some importance developed in its lower portion and moved slowly to the Lakes.

At 11 a.m. on the 10th, as the depression was nearing the Lakes and developing, and another important depression was approaching from the Northwest, signals were changed on Lake Superior to No. 4 for a heavy gale from S.-W. to W. and N.-W. and at 4 p.m. signals at all other stations were changed to No. 3 for a heavy gale from S. to W. and N.-W.

The two depressions joined over the Lakes and passed northeastward as a single depression causing a moderate to strong gale from the S.-E. to W. and N.-W. The gale seems to have been very heavy on the Georgian Bay and Lake Huron during the night of the 10th, and morning of the 11th, blowing 60 miles per hour from the S.-W. at Presqu'Isle, and 60 miles S.-W. at Goderich. Lake signals were lowered at 4 p.m. on the 12th.

At 11 p.m., all stations in the Bay of Fundy and those along the Gulf coast between Father Point and Chatham, were warned for a strong easterly gale. The depression however, dispersed after leaving the lakes and gave no storm in these districts.

No. 3. On the 15th, two narrow wedges of low pressure appeared, one over Manitoba, and the other over the Southwest States. At 10 a.m. signal No. 4 for a strong W. gale was ordered for Lake Superior, and cautionary, E. signals were ordered for all other Lake stations. By night the two wedges had joined and an important cyclone formed, which was central at 8 p.m. over Wisconsin, at 10 p.m. signals were changed to No. 4 on Lake Erie and Ontario for a strong westerly gale, and to No. 3 on Georgian Bay and Lake Huron, for a strong S. to W. and N.-W. gale.

A moderate S.-E. to S.-W. gale occurred at most places on the 15th; the depression during the day passing to the N. of the Lake district and dispersing. It was soon followed by a subsidiary depression, which quickly developed over the Lakes during the night of the 16th, which caused a fresh to heavy gale throughout the Lakes on the 17th, blowing at first at some places from the S.-E., but being general later in the day from the N.-W. and S.-W. Presqu'Isle reports 50 miles per hour from the N.-W., Goderich 67 miles W. S.-W., Port Stanley 40 miles S.-E., Toronto 60 miles N., and Kingston 40 miles S.-W.

As the cyclone moved northeastward, all Eastern stations were warned at 10.40 a.m. on the 17th, to expect a strong gale from the E. shifting to S.-W. and W. during the 17th, a fresh to heavy gale occurred throughout eastern Canada, at first from the S.-E. veering to W. and N.-W. St. John N. B. reported 54 miles per hour from the S. and Father Point 56 miles S. The cyclone passed off the coast on the 18th.

No. 4. An important cyclone was over Montana on the 20th, moving south-eastward. That evening cautionary E. signals were ordered for all stations on Lake Erie and the western portion of Lake Ontario and signals for a strong gale from E. to N. and N.-W. were ordered for Lake Superior stations. At 10 a.m. the next morning all Georgian Bay and Lake Huron stations were warned for a strong gale from the S., shifting to W. and N.W. Cautionary signals on Lakes Erie and Ontario were changed to No. 4, and the same signal ordered for stations on Lake Ontario not already warned. The depression dispersed over the Lakes on the 21st, after giving high winds on Lake Erie and the Georgian Bay, but another depression quickly developed in the S.-W. and moved to the Lakes, causing a fresh to heavy gale throughout the Lake district during the 23rd and 24th, the wind reaching a velocity of 70 miles per hour from the S.-W. on Lake Huron, and between 35 and 65 miles an hour on the other Lakes. By the night of the 24th the storm had moved to the Gulf of St. Lawrence and signals were lowered at Lake stations.

On the 23rd, at 11 a.m., cautionary E. signals were ordered in advance of the same storm for Bay of Fundy stations, and the same afternoon signals for a strong gale from the E., shifting to the S. and S.-W., were ordered up at all Eastern stations. 58 miles per hour from the S.-W. was recorded at Father Point and there was also a moderate to fresh gale on the Gaspé coast and in the Bay of Fundy during the night of the 23rd and on the 24th. No storm was reported elsewhere.

No. 5. On the morning of the 26th a depression which had come from the west was central over Lake Superior and developing in energy. At 10 a.m., signals for a strong gale from the S., shifting to W. and N.W., were ordered for all Lake stations.

During the 26th and 27th a moderate to fresh gale from the S.-E., shifting to S.-W. and N.-W., prevailed over the Lake district. The wind at some stations also blew hard from the N.-E. as another cyclone quickly followed and passed south of the Lakes. 70 miles per hour from the N.-E. was recorded at Pelee Island and 60 miles S.-W. at Goderich. As the first depression moved east from the Lakes all stations in Eastern Canada were warned, at 10 p.m. on the 26th, for a strong gale from the E., and at 11 a.m. on the 27th signals were changed to No. 4 for a strong westerly gale. Nearly all stations reported a fresh to heavy gale at first from the E., shifting to W. and N.-W. during the 27th and 28th as the cyclone passed across this district and off the Gulf coast.

TORONTO OBSERVATORY, MAGNETIC REVIEW FOR NOVEMBER, 1891.

The magnets were slightly disturbed on the morning of the 1st, but quieted down about 10 a.m. On the morning hours of the 2nd, 3rd, 4th and 5th slight disturbance was visible. There was nothing of importance recorded until the morning of the 14th, when some sharp oscillations set in and continued until 7 p.m., the curves before 8 p.m. taking up an undulatory appearance. This slight disturbance became more important at 8.55 p.m. of the 15th, the declination magnet then moving 19' to the east in a short period. It resumed its normal position about 10 p.m., when the disturbance became barely perceptible. The 16th can hardly be called a quiet day, as during the morning hours minute changes were going on, and during the night there was a tendency for the movements to increase. After 10 p.m. the magnets became perfectly steady. The next important disturbance appeared on the evening of the 19th, but it was not until the morning of the 20th that it assumed more marked features. A sharp westerly rise of 33' at 3.30 a.m. was the most prominent movement; after the magnet had reached its extreme it vibrated considerably for about five minutes, it then slowly moved east, still vibrating. After 4 a.m. slow waves of disturbance were shown until 7 a.m., sharp oscillations following until noon. At 1 p.m. the disturbance was again at work and continued up to the 23rd. On the morning of the 21st the movements were undulatory; also between midnight and 2 a.m. of the 22nd. The magnets quieted down shortly after 10 a.m. of the 23rd.

Both forces were considerably affected on the 19th and 20th. A little before 6 p.m. of the 19th the vertical component commenced to decrease until 3.35 a.m. of the 20th, it then slowly regained its normal reading. The horizontal force diminished rapidly after 8 p.m., and reached its lowest reading at 3.37 a.m.; it then vibrated gradually to its normal reading. On the afternoon of the 20th and 21st both components were changing rapidly, especially the v. l. On the night of the 23rd slight disturbing action set in and continued more or less to the end of the month.

There were no auroras observed in Toronto during the month. On the 2nd, 3rd, 4th, 8th, 9th, 10th, 13th, 14th, 15th, 16th, 19th, 20th, 21st, 22nd, 23rd, 24th, 26th, 27th, 28th and 29th the sky was clear but no aurora was observed. On all other nights clouds or haze would have hidden any aurora which might have existed.

CHARLES CARPMAEL,

Director.

METEOROLOGICAL OFFICE,

TORONTO, January 9th, 1892.

METEOROLOGICAL SERVICE

Monthly Review

DECEMBER, 1891.

INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraphic reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

ATMOSPHERIC PRESSURE.

The average pressure, as determined from the observations taken at telegraph reporting stations was below the normal of seventeen years in Manitoba and the North-West Territories, in Quebec it was slightly below, while in the Maritime Provinces, and in the greater part of Ontario, it was above the normal.

The month has been marked by a general tendency for anticyclonic conditions to prevail over the eastern parts and off the Atlantic Coast of the States and Canada, causing cyclones to take a course more northward, and their centres to pass more to the north of the Lake and Eastern Districts, bringing there abnormally mild weather during the greater part of the month.

From the 1st until the 6th an extensive cyclone was moving over the country. Fresh to strong S.E. and S.W. wind and fair, mild weather, prevailed throughout the Lake and Eastern Districts. During the 3rd there was a general increase in pressure over these districts, whilst the cyclone developed in energy and extended from the Hudson's Bay to the Gulf of Mexico. In the extreme north-west higher pressure and fair, colder weather set in; but in Manitoba there was a snow storm, with a strong gale from the N.E. and N.

By night a S.E. gale was blowing throughout the Lake district, accompanied by rain. During the 4th the gale continued and shifted to the S.W., and by the morning of the 5th the cyclone extended from Manitoba to the Gulf of St. Lawrence, and a S.W. to W. gale was blowing everywhere east of Assiniboia. There was some rain in Quebec, but elsewhere the weather was fair. No decided change in temperature took place in the Lake and Eastern Districts; but colder weather covered the whole North-West. The cyclone passed over Labrador and Newfoundland on the 6th.

A cyclone was approaching the Lakes from Texas during the 6th, and at night was over this district, giving a general fall of snow. It moved quickly to the Gulf of St. Lawrence, causing snow throughout Quebec and Northern New Brunswick and rain in Southern New Brunswick and in Nova Scotia.

A similar period to that which occurred during the first week now followed, a general decrease in pressure took place over the whole North West and in the northern portions of Ontario and Quebec, giving gradient for south-westerly winds and higher temperature everywhere.

There was little change in the position of this extensive cyclone until the 10th, the weather continuing generally fine and mild everywhere, the wind at times increasing locally to a gale.

The 10th brought a change, and a bodily movement eastward of the cyclone was noticeable. Higher pressure and colder weather appeared over the North-West, and anticyclonic conditions soon spread over the whole country, the cyclone disappearing off the eastern coasts.

The anticyclone brought lower temperatures in Northern Ontario and the Eastern Provinces, but it had little effect on the temperature in the Lake district, where it continued much about the same.

On the 12th the pressure was decreasing in the North west, but with this exception the anticyclone covered the whole of the States and the rest of Canada.

The outer southern edge of the cyclone, which had appeared in the North-west, passed eastward across the country to Newfoundland, dipping south-eastward over the Maritime Provinces, giving a continuance of S.W. to W. winds throughout, and an increase in temperature, excepting the Lake District, where there was little change, the weather continuing fair everywhere until the 14th, with the exception of some light local snow falls in Nova Scotia on the 12th.

Higher pressure followed over the North-West on the 13th, with a little lower temperature and on the 14th, there was a general increase of pressure over Northern Ontario, and an anticyclone spread over Ontario and the Eastern Provinces giving fine colder weather in Eastern Ontario and the Eastern Provinces; this was of short duration however, for a cyclone moved up from the South-West States to the Lakes, where it gave a general fall of rain in Southern Ontario and sleet or snow in Northern Ontario on the 15th. It quickly moved over the Eastern Provinces causing a general snowfall in Quebec, and rain in the Maritime Provinces, or snow and sleet in the Northern portion on the 16th. It was accompanied throughout by strong winds and gales from the E. shifting to W. and N.W. During the night of the 16th, it passed over the Gulf of St. Lawrence and was followed over the Lakes and Eastern Canada by clearing colder weather.

After the 13th, the high pressure with fine moderately cold weather, continued over the North-West until the 16th, when somewhat lower pressure and rising temperature set in.

Anticyclonic conditions continued over the Lakes and Eastern districts until the 22nd, with fine weather and slight increases in temperature. The lower pressure which set in on the 16th, over the North-West, continued there until the 21st with fair weather and moderate temperatures, when more anticyclonic weather and a fall of temperature took place. The low pressure was then transferred to the Lake district, where it developed into a well formed cyclone on the 22nd, and caused a general rainfall with high S. to W. winds. From thence it passed eastward with diminished energy, causing local rains throughout Eastern Canada. Cyclonic conditions again appeared over the North-West on the 22nd, with somewhat higher temperature, and a general but moderate snowfall.

24th brought an important anticyclone which quickly spread over the entire North-West and was accompanied by decidedly low temperature. Some rain fell in Southern Ontario and along the St. Lawrence on the 24th and 25th, owing to the passage of a depression to the South of the Lakes, which also caused rain on the 25th in the Maritime Provinces as it passed to the South of them.

On this day a trough of low pressure extended from Hudson's Bay to the Gulf of Mexico. In this an important cyclone developed, which was central over Wisconsin at night and moving north-eastward. It was accompanied by rain and a fresh S. to W. gale throughout the Lake and Eastern districts, and crossed Newfoundland on the 28th. Then followed the anticyclone, which covered the North-West on the 24th, which soon spread over the Lake and Eastern districts, accompanied by fine weather and lower temperature. An important cyclone, which had moved inland from the Pacific, covered the whole North-West on the 27th, accompanied by higher temperature and a gale from the S.E. and S.W. The cyclone moved eastward, and at night on the 28th, cyclonic conditions extended from Hudson's Bay to Texas; higher temperatures prevailed over the Lake district, and during the 29th local rains and strong W. and S.W. winds were experienced there, and strong winds or a gale from the S.E. and S.W., with some rain or sleet in Quebec next day.

The cyclone, in conjunction with a subsidiary, which formed to the south, developed into a very important cyclone, and a strong gale, accompanied by rain, which turned to snow in New Brunswick and Eastern Quebec, prevailed during the 30th and 31st throughout Eastern Canada.

An anticyclone and fine colder weather followed this cyclone over the North-West on the 29th. It soon moved to the Lakes, giving fine cold weather throughout the Lake district and Western Quebec on the 30th, and extended throughout the Eastern district during the 31st, as the cyclone moved off the coast.

A decrease in pressure for a short time in the North-West on the 30th caused a light snowfall in Assiniboia and Manitoba, but the pressure again increased on the 31st.

TEMPERATURE.

The average as determined from the observations was above the normal throughout Canada, except in British Columbia, the greatest excess occurring generally in the northern sections of Ontario.

The highest and lowest Temperatures in each Province during December were:

British Columbia, 58°·0 on 10th, at Esquimalt; - 5°·0 on 30th, at Barkerville.
N.W. Territories, 60°·0 on 16th, at Maple Creek; - 42°·8 on 31st, at Prince Albert.
Manitoba, 41°·0 on 8th, at Oakbank; - 40°·0 on 25th, at Fort Ellice.
Ontario, 64°·8 on 4th, at Georgina; - 31°·2 on 30th, at White River.
Quebec, 53°·0 on 5th, at St. Hyacinthe; - 10°·5 on 31st, at Quebec.
New Brunswick, 52°·5 on 24th, at Grand Manan; - 8°·0 on 18th, at Bathurst.
Nova Scotia, 56°·0 on 5th, at Yarmouth; 6°·0 on 8th, at Truro.
P.E. Island, 50°·4 on 24th, at Georgetown; 4°·2 on 1st at Kilmahumaig.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION, &c.—Continued.

STATION.— <i>City, &c.</i>	PRESSURE IN INCHES			TEMPERATURE OF AIR.				MEAN AMOUNT OF CLOUD.				DIRECTION OF WIND FROM						VELOCITY OF WIND.			PRECIPITATION.												
	Mean.	Range.	in.	Diff. from aver- age.	Years observ- ed.	Highest.	Date.	Lowest.	Date.	Mean daily range.	(Greatest daily range).	Mean relative Humi- dity.	Mean amount of cloud. No. of days completely clouded.	N.	N. E.	E.	S. E.	S.	W.	N. W.	Total number of hours.	Mean miles per hour.	Highest days velocity.	Date and direc- tion.	Amount. in.	Diff. from aver- age.	No. of days.	No. of Auroras.	No. of Thunder storms.	No. of Fogs.			
Axe Lake.....	28.4	28.4	29.4	0	9 8	54.7 0	4	5.0	16-17	11.6	32.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.53	1.23	5.26	0	0	0	0		
Goldwater.....	29.9	29.9	29.9	0	.....	49.4	22	5.2	18	15.4	35.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.51	0.22	9.22	0	0	0	0	
Beatrice.....	30.1	30.1	30.1	0	7 1	15.47.5	3	5.5	17	13.0	32.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.70	0.24	11.20	0	0	0	0	
Greenhurst.....	30.6	30.6	30.6	0	.....	20.56.0	4.5	2.0	17	15.0	43.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.21	0.14	9.22	2	0	0	0	
North Bruce.....	33.5	33.5	33.5	0	8.5	3.57.0	1	10.0	28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.35	0.15	10.21	0	0	0	0	
Rockville.....	29.6	29.6	30.0	29.58	1-12	10.4	14.49.0	12-13	10.0	21	17.4	30.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.49	0.97	9.22	0	0	0	0	
Zurich.....	33.3	33.3	33.3	0	5.9	10.62.0	4	8.0	17	19.0	40.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5.75	1.53	10.21	0	0	0	0	
Point Clark.....	35.4	35.4	35.4	0	8.7	19.54.5	3	16.0	17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.18	1.06	7.24	0	0	0	0	
St. Mary's.....	31.8	31.8	31.8	0	3.5	2.52.0	3	6.0	18	14.9	29.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.09	0.97	9.22	0	0	0	0	
Paris.....	32.7	32.7	32.7	0	9.5	1.52.5	3	8.5	17	16.2	27.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.13	0.83	10.21	0	0	0	0	
Lacknow.....	33.0	33.0	33.0	0	5.5	5.51.5	3	7.5	17	13.8	27.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.86	1.24	13.15	0	0	0	0	
Bozner.....	31.5	31.5	31.5	0	10.6	1.49.0	3	2.0	28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.72	0.37	14.17	0	0	0	0	
Bismar.....	32.2	32.2	32.2	0	6.3	9.53.8	15	10.2	19	11.6	29.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.77	0.70	13.15	0	0	0	0	
Cottam.....	38.6	38.6	38.6	0	7.8	3.52.0	3	16.0	17-18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.70	1.17	8.23	0	0	0	0	
Point Pelier.....	35.7	35.7	35.7	0	6.7	14.51.0	20	29.0	27	8.4	18.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.22	0.92	7.24	0	0	0	0	
King'sville.....	34.2	34.2	34.2	0	7.2	1.51.8	15	12.0	18	9.6	24.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.60	0.93	12.19	0	0	0	0	
Chatham.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ridgeway.....	34.2	34.2	34.2	0	4.4	6.54.0	22	16.0	17-18	15.4	29.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.49	0.51	13.15	0	0	0	0
Woodstock.....	30.9	30.9	30.9	0	4.7	1.55.5	4	2.5	18	16.4	28.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.65	0.44	14.17	0	0	0	0
London.....	33.1	33.1	33.1	0	5.6	8.55.0	15	8.2	20	14.4	31.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.83	0.55	15.16	0	0	0	0
Port Stanley.....	33.8	33.8	33.8	0	8.1	5.11.1	15	6.1	18	12.9	24.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.39	0.46	16.15	0	0	0	0
Brantford.....	34.9	34.9	34.9	0	9.0	11.49.0	14	29.0	20	8.6	15.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. George.....	32.4	32.4	32.4	0	5.2	7.52.0	3	11.0	18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.05	0.57	13.15	0	0	0	0
Port Dover.....	34.3	34.3	34.3	0	6.7	11.53.8	15	8.0	18	13.0	27.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.84	0.69	17.14	0	0	0	0
Guelph.....	29.3	29.3	30.7	30.72	29.47	1-25	2	5.0	17	13.0	26.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.54	1.24	10.21	0	0	0	0
Elora.....	29.9	29.9	29.9	0	5.4	8.49.0	4	6.0	28	12.3	25.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.77	0.42	6.25	0	0	0	0
Galt.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Niagara Falls, S.....	34.3	34.3	34.3	0	4.5	6.57.0	4	10.0	17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.68	0.91	9.22	0	0	0	0
Sault Ste. Marie.....	30.9	30.9	30.9	0	6.8	2.48.0	22	1.4	17	12.8	27.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.17	0.27	10.21	0	0	0	0
DeCewville.....	34.2	34.2	34.2	0	4.2	2.54.0	3	10.0	18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.97	1.93	12.19	0	0	0	0
Sombra.....	31.7	31.7	31.7	0	3.3	3.55.9	15	13.0	17	12.1	33.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.50	0.25	13.15	0	0	0	0
Mattawa.....	29.3	29.3	29.3	0	13.3	2.48.0	27	0.1	17	14.6	27.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.55	2.65	11.20	0	0	0	0
Collingwood.....	32.9	32.9	32.9	0	5.0	7.50.0	6	10.0	18	13.6	22.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.24	0.66	7.24	0	0	0	0
Stony Creek.....	35.9	35.9	35.9	0	5.6	7.58.0	4	10.0	17	13.2	25.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.06	1.10	11.20	0	0	0	0
Georgetown.....	37.1	37.1	37.1	0	11.6	3.04.8	4	1.5	16	26.0	47.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.99	0.84	5.26	0	0	0	0
Shanley.....	31.4	31.4	31.4	0	7.6	3.47.8	4	0.1	17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.32	0.84	13.15	0	0	0	0
Toronto.....	33.4	33.4	30.6	30.68	29.50	1-18	4	2.4	17	13.0	24.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.88	0.10	14.17	1	0	0	0
Alton.....	30.1	30.1	30.1	0	6.0	4.17.0	5	1.9	17	13.3	26.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.51	0.79	14.17	1	0	0	0
Lindsay.....	29.5	29.5	30.09	30.71	29.46	1-28	2	3.5	17	14.1	33.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.55	0.60	13.15	0	0	0	0
Norwood.....	29.8	29.8	29.8	0	9.6	11.50.5	5	2.0	17-18	12.9	28.0	3.60	0.56	9.22	0	0	0	0
Oshawa.....
Deseronto.....	31.9	31.9	31.9	0	6.8	9.51.3	4	2.6	17	13.8	27.7																	

ONTARIO—Continued

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QUEBEC

Montreal	30-04 30-51 29-27	1-46	20-7	10-8 17-52-5	4	-4-0	17	14-1 31-5	23-5	78	6	5	26	58	27	64	63	118	74	10	4	744	20-9	37-2	9	SW	3-34	-0-39 17-14	0 0 5	
St. Hyacinthe	30-53	23-1 1-53-0	5	0-0	18	15-4 21-0																				1-95	-1-95 9-22	0 0 0		
Roberval	22-8	5-6 11-48-6	5	-3-5	31	17-9 31-9																					3-47	-0-53 11-20	0 0 0	
Richmond	22-4	16-0 13-16 4	23	-5-6	17	18-9 31-4																					0-71	-1-73 8-23	1 0 0	
Chateaufort	25-5	11-5 17-45-2	26	-19-5	31	14-8 25-5																					2-51	-1-82 19-12	0 0 0	
Quebec	30-01 29-52 29-19	1-43																												
Lebanon	28-6	9-3 10-50-4	4	7-0	17	12-4 27-0																					1-94	-0-04 13-18	0 0 0	
Brion	25-9	11-4 17-43-9	23	0-1	20	15-1 31-0																					3-70	-1 15 16-15	0 0 0	
Point du Mont	29-52 30-49 28-90	1-50																												
Cape Chatte																														
Boquet																														
Cape Medelene	24-7	6-7 9-47-0	23	0-0	29																							2-06	-0-94 13-18	0 0 0

NEW BRUNSWICK

Fredericton	30-01 30-51 29-01	1-18	28-1	9-4 18-49-8	23	0-5	17	17-2 31-9	23-8	78	6	8	12	1	51	6	1	3	15	0	2	93	9-0	20-1	31	W	2-99	-0 51 12-19	1 0 3	
Charlottetown	29-04 30-46 28-88	1-59	25-8	9-4 17-43-7	27	3-3	20	15-3 30-9																			2-24	-1-28 14-17	0 0 0	
Bathurst	29-86 30-35 29-08	1-27	28-2	8-4 15-49-0	24	-8-0	18	21-0 42-0																			1-60	-1-30 8-23	0 0 0	
St. Andrews	31-3	7-7 17-51 7	5-24	-3-6	17	16-7 29-1																					2-86	-0-21 11-20	0 0 0	
Grand Falls	29-99 30-41 29-42	0-99	31-5	6-9 8-52-5	24	7-0	17	15-0 25-0																			3-55	-0-40 11-20	0 0 1	
St. John's	31-4	8-2 11-46-0	23	9-0	17																							3-95	-0-25 10-21	0 0 1
St. John's	29-29 30-49 29-01	1-18	31-9	7-2 8-49-6	5-24	6-0	11	14-7 30-4	27-5	77	6	5	9	16	2	11	17	42	30	48	11	186	15-0	37-3	31	W	3-93	-1-00 12-19	0 0 0	
St. John's	30-00 30-49 29-05	1-16	31-8	8-7 11-49-0	24	7-0	17	12-1																			3-51	-1-31	0 0 0	
St. John's	29-9	6-7 3-45-0	30	4-0	1	10-2 25-0																					3-63	-1-19 11-20	5 0 2	
St. John's	25-2	10-9 17-47-5	23	-2-0	29	19-6 36-5																					2-99	-0 10 12-19	0 0 0	

NEW SCOTIA

Halifax	30-01 30-58 29-03	1-55	33-9	7-7 17-32-0	7	12-6	18	15-9 26-0	30-0	80	6	3	29	9	53	22	25	78	29	2	1	248	8-0	19-0	30	E	4-07	-1-30 16-15	0 0 0	
Halifax	29-91 30-53 28-88	1-67	32-7	4-5 21-53 2	5	16-0	21	13-0 25-5	29-7	82	7	5	7	16	18	12	6	64	22	23	18	186	12-6	27-5	17	SW	3-25	-1-63 14-17	1 0 0	
Halifax	30-03 30-48 29-13	1-25	35-1	5-3 11-59-0	5	15-0	18	14-0 25-7																			3-63	-0-21 18-13	0 6 4	
Halifax	30-02 30-53 29-12	1-41	30-6	5-5 18-23-7	7	6-0	1	19-7 32-2																			2-45	-0-14 16-15	4 0 0	
Halifax	32-6	3-6 12-52-5	23	3-0	18	14-5 27-0																						1-53	6-25	0 0 0
Halifax	31-2	7-8 11-47-0	23	10-0	31																							1-05	-2-65 9-22	0 0 0
Halifax	31-4	4-0 8-4-0	7	17-0	17																							2-70	-0-82 8-23	0 0 3

NEW YORK

Albany	29-90 30-53 29-41	1-52	31-0	2-3 19-57-0	27	7-0	26	12-5 27-0																			2-68	-2 43 13-18	0 0 2	
Albany	30-25 30-53 29-06	0-10	61-2																								0-39		8-23	0 0 0

P. E. I. AREA

Charlottetown	29-88	6-1 13-47-6	24	1-2	1	15-9 26-4																					2-03	-1-63 14-17	0 0 1
Charlottetown	32-2	12-2 1-50-4	24	13-0	13-17 12-4 23-5																						2-89	-0-14 10-21	1 0 0
Charlottetown	31-0	7-5 15-40-8	24	11-5	18	12-6 23-3																					3-11	-1-00 14-17	0 0 0

PELTON AREA

Albany	29-87 30-51 28-80	1-73	40-2	3-5 1-58-0	16	28-4	21	3-2 13-8	47-2	97	7	8	15	1	5	53	8	5	12	21	36	186	9-4	23-7	29	S	12-58	-4-50 25-6	0 0 0				
Albany	30-9	1-4 3-57-0	16	28-0	2-6 5-57-0	8	22-0	21	17-6 22-0																		10-22	-1 42 17 11	0 2 3				
Albany	18-6	1-4 3-45-0	16	28-0	1-4 3-45-0	8	22-0	21	17-6 22-0																		4-20	-0-50 14-17	0 0 0				
Albany	37-2	0-8 1-4-0	16	25-0	6-9 25-0																						17-93	10 26 26 5	0 0 0				
Albany	36-1	1-8 3-50-0	16	20-0	24 3-1 20-0																						0-66	-2-1	27	E	18-07	-6-12 24 7	0 0 4
Albany	34-6	0-5 2-56-0	16	22-0	23 3-9 18-0																						10-71	-3-69 19-12	0 0 0				
Albany	31-1	0-3 3-53-5	16	30-0	24 12 3-21 0	28-0	86	7	3	7	13	2	6	5	6	6	36	77								3-6	11-7	11	S	1-22	-0-47 9-22	0 0 0	
Albany	37-1	3-3 5-33-5	15	42-6	24 9-6 15-4																						20-15	10 36 27 4	0 1 0				

STATIONS RECEIVED TOO LATE FOR NOVEMBER, 1891.

PROVINCE.	STATION.	MEAN TEMP.	HIGHEST TEMPERATURE.		LOWEST TEMPERATURE.		PRECIPITATION.		AURORAS.	THUNDER STORMS.
			Temp.	Date.	Temp.	Date.	Amount.	Days.		
British Columbia	Fort Simpson	11.69	57.0	25	19.6	11	18.34	24		
Manitoba	Channel Island	16.37	11.5	6	-22.5	26	0.21	10	6	
N. W. Territory	Oonikup	10.29	43.0	6	-33.0	27	0.93	15		
Ontario	St. George	36.54	66.0	9	9.0	29	4.92	16		
	Chatterburg	31.00	63.3	9	-5.3	29	2.52	9	6	7, 16.
New Brunswick	St. John City	37.20	56.0	11	8.0	30	3.74	10		
	Bathurst	28.21	49.0	24	-8.0	18	1.60	8		

Lake Winnipeg frozen over on 16th November.

ABSTRACT OF OBSERVATIONS MADE AT CHRIST CHURCH MISSION, PEACE RIVER, N.W.T., DURING 1890-91.
BY REV. J. GOUGH BRICK, B.A.

	TEMPERATURE.					MEAN AMOUNT OF SKY CLOUDED.	RAIN.		SNOW.		DIRECTION OF WIND FROM								
	Mean.	Highest.	Lowest.	Monthly Range.	Greatest Daily Range.		Amount.	Days.	Amount.	Days.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Calm.
1890	°	°	°	°	°		in.		in.										
December	6.58	45.0	-10.0	85.0	17.10	0.2	0.50	2	5.0	2	13	12	1	3	1	6	5	21	0
1891																			
January	5.57	50.0	-50.0	100.0	19.77	0.2	0.00	0	17.0	5	11	19	0	0	0	5	27	0	0
February	-9.10	26.0	-55.0	81.0	28.89	0.1	0.00	0	2.0	2	22	19	0	0	0	2	9	2	2
March	16.27	51.0	-30.0	90.0	35.00	0.3	0.00	0	3.5	2	6	7	2	0	0	3	4	9	0
April	43.52	75.0	1.0	74.0	38.43	0.0	0.21	2	*	1	0	12	0	6	0	3	28	11	0
May	48.82	92.0	7.0	99.0	34.81	0.1	1.59	4	1.5	2	11	1	10	3	8	6	17	5	1
June	56.04	80.0	32.0	48.0	31.47	0.2	1.50	9	.....	.....	0	6	3	10	7	17	16	1	0
July	62.09	86.0	33.0	53.0	29.29	0.2	4.94	10	.....	.....	0	1	1	8	27	6	14	2	0
August	59.40	88.0	30.0	58.0	35.90	0.1	0.35	2	.....	.....	3	5	1	0	3	14	23	13	0
September	52.87	83.0	25.0	58.0	29.35	0.2	0.50	1	.....	.....	1	3	4	1	5	12	4	10	0
October	34.70	74.0	-13.0	87.0	26.67	0.3	0.21	2	11.0	2	0	15	7	1	0	3	10	3	0

Mr. Brick remarks, that this was the mildest winter that I have ever seen in this country, weather continuing mild until the last day of January.

PRECIPITATION.

The rainfall for December has, with the exception of Nova Scotia, slightly exceeded the normal; in the Pacific Province the amount has on the coast been exceptionally large, and in the northern part of the interior heavy snow has fallen.

The general distribution is as follows:—

In BRITISH COLUMBIA the rainfall on the coast was 13.10 in., or about twice the average—in the interior little or no rain has fallen.

In the NORTH-WEST TERRITORIES the rainfall was inappreciable, or 0.10 below the average quantity.

In MANITOBA the rainfall was about the average, the quantity being 0.08 in., and that fell on the first two days of the month.

In ONTARIO, West and South West District it was 2.21 in., or 0.74 in. above the average. In the North and North-West District it was 1.18 in., or 0.38 in. above the average. In the Central District it was 2.07 in., or 1.03 in. above the average; and in the East and North-East District it was 1.62 in., or 1.14 in. above the average.

In QUEBEC it was 0·98 in., or 0·25 in. below the average.

In NEW BRUNSWICK it was 2·35 in., or 0·77 in. above the average.

In NOVA SCOTIA it was 2·76 in., or 0·81 in. below the average.

In PRINCE EDWARD ISLAND it was 1·86 in., or 0·11 in. above the average.

Rainfall 5 in. and upwards during month :-

BRITISH COLUMBIA - Quamichan, 9·77 in.; Abbotsford, 10·31 in.; Agassiz, 15·53 in.; Port Moody, 15·39 in.; Fort Simpson, 18·82 in.; Esquimalt, 11·24 in.

ONTARIO - Mattawa, 5·15 in.

Rainfall 1 inch and upwards in 24 hours :-

2nd, Little Forks, 1·50 in.

3rd, Nepigon, 1 in.; Little Forks, 1·50 in.; Fort Simpson, 1·00 in.

4th, Cartier, 1·50 in.; Norwood, 1·00 in.; Sprucedale, 1·25 in.; Ignace, 3·25 in.; Nepigon, 1·00 in.;
Mattawa, 5·00 in.; Peterborough, 1·05 in.; Port Hope, 1·30 in.; Ennismore, 1·30 in.; Renfrew,
1·01 in.; London, 1·07 in.; Durham, 1·20 in.; Port Arthur, 1·00 in.

6th, Nelson, 2·00 in.; Quamichan, 1·80 in.; Fort Simpson, 1·63 in.

7th, Zurich, 1·00 in.; Quamichan, 1·00 in.; Agassiz, 1·95 in.; Port Moody, 3·20 in.; Esquimalt,
1·46 in.

8th, Esquimalt, 1·21 in.

10th, Fort Simpson, 1·30 in.

11th, Abbotsford, 1·80 in.

12th, Quamichan, 1·30 in.; Agassiz, 2·15 in.; Port Moody, 2·75 in.

14th, Cayuga, 1·05 in.; Scarboro, 1·11 in.; Thedford, 1·36 in.; Presque Isle, 1·00 in.; Elora, 1·10 in.;
Durham, 1·00 in.; Fort Simpson, 2·47 in.

15th, Shannonville, 1·30 in.; Georgetown, 1·22 in.; St. Mary's, 1·25 in.; Quamichan, 1·35 in.; Port
Dover, 1·00 in.; Fort Simpson, 2·71 in.

16th, Halifax, 1·24 in.

17th, Port Moody, 1·05 in.

18th, Abbotsford, 1·27 in.; Port Moody, 1·02 in.

19th, Fort Simpson, 1·02 in.

20th, Port Moody, 2·22 in.

21st, Abbotsford, 1·23 in.

22nd, Point Lepreaux, 1·10 in.; Collingwood, 1·20 in.; Agassiz, 2·47 in.; Esquimalt, 2·30 in.

24th, Guelph, 1·00 in.

25th, Fort Simpson, 1·20 in.

26th, Esquimalt, 1·01 in.

31st, Fredericton, 1·05 in.

SNOWFALL.

The snowfall has, with the exception of British Columbia and Manitoba, been in general light, on the Pacific Coast, the amount in addition to the rain being unusually heavy and in Manitoba it is the heaviest since 1882, or almost three times the average amount.

The distribution is as follows :-

BRITISH COLUMBIA. - On the coast quite a large quantity has fallen, and in the Interior upwards of three feet is recorded.

In N. W. TERRITORIES about 7 in. has fallen.

In MANITOBA 1·30 in. has fallen, or about three times the average.

In the districts of ONTARIO the amount is 1·0 in., or 11·2 in. below the average; 0·1 in., or 13·8 in. below the average; 7·1 in., or 7·0 in. below the average; 5·4 in., or 13·0 in. below the average.

In QUEBEC 1·16 in., or 9·8 in. below the average.

In NEW BRUNSWICK 0·0 in., or 13·2 in. below the average.

In NOVA SCOTIA 3·5 in., or 16·7 in. below the average.

In P. E. ISLAND 7·0 in., or 18·4 in. below the average.

Monthly Snowfall 12 in. and upwards.

BRITISH COLUMBIA—Barkerville, 42 in.; Agassiz, 24 in.; Port Moody, 27 in.; Fort Simpson, 13 in.; Esquimalt, 13 in.

MANITOBA AND N. W. TERRITORIES—Swift Current, 12 in.; Norquay, 22 in.; Oak Bank, 18 in.; Posen, 15 in.; Banff, 36 in.; Morden, 31 in.; Belmont, 23 in.; Gretna, 24 in.; Cartwright, 15 in.; Rathwell, 16 in.; Hartney, 21 in.; Rosebury, 38 in.; Clandeboye 17 in.; Cartwright (2) 24 in.

ONTARIO—Bancroft, 14 in.; Uplands, 15 in.; Norwood, 15 in.; Savanne, 15 in.; Sharon, 14 in.; Bognor, 20 in.; Sault St. Marie, 15 in.; Georgina, 14 in.; Mount Forest, 12 in.; Wiarton, 13 in.; Midland, 14 in.; Huntsville, 12 in.; Orangeville, 16 in.; Thedford, 12 in.; Presque Isle, 14 in.; Orillia, 15 in.; Barrie, 12 in.; Owen Sound, 22 in.

QUEBEC—Cape Magdalen 15 in.; Father Point 34 in.; Quebec, 12 in.; Montreal, 12 in.

NOVA SCOTIA—Yarmouth, 14 in.

NEWFOUNDLAND—St. Johns, 14 in.

Snowfall five inches and upwards in 24 hours.

3rd, Winnipeg, 6 in.

4th, Oakbank, 12 in.; Killarney, 6 in.; Morden, 24 in.; Belmont, 13 in.; Gretna, 15 in.; Foxton, 8 in.; Rathwell, 11 in.; Roseberry, 18 in.; Clandeboye, 12 in.; Cartwright, 18 in.; Norquay, 10 in.

5th, Goderich, 5 in.

6th, Norwood, 6 in.; Haliburton, 5 in.; Alton, 5 in.; Beatrice, 6 in.; Point Clark, 6 in.; Presque Isle, 6 in.; Orillia, 5 in.; Cartwright, 8 in.

7th, Bancroft, 7 in.; Sharon, 6 in.; Banff, 6 in.; Point Escuminac, 5 in.; Orangeville, 5 in.; Lucknow, 5 in.; St. Mary's, 7 in.; Quebec, 5 in.

11th, Barkerville, 6 in.

12th, Banff, 20 in.; Esquimalt, 11 in.

13th, Orangeville, 10 in.; St. Johns, Nfld., 6 in.

14th, Georgina, 7 in.; Durham, 12 in.

15th, Sault Ste. Marie, 8 in.; Owen Sound, 6 in.; Ottawa, 5 in.; Alexandria, 5 in.

16th, Dalhousie, 10 in.; Bathurst, 6 in.; Father Point, 11 in.; Yarmouth, 6 in.

17th, Cape Magdalen, 6 in.; Ignace, 5 in.; St. Thomas, 5 in.; Wilton Grove, 6 in.; London, 6 in.; Father Point, 5 in.

20th, Hartney, 5 in.; Barkerville, 5 in.; Agassiz, 5 in.

22nd, Savanne, 5 in.

23rd, Port Moody, 6 in.

24th, Uplands, 5 in.; Fort Ellice, 6 in.; Hillview, 8 in.; Belmont, 8 in.; Gretna, 6 in.; Roseberry, 6 in.

25th, Agassiz, 5 in.; Truro, 5 in.

26th, Georgina, 5 in.

27th, Owen Sound, 10 in.

28th, Savanne, 5 in.

29th, Hartney, 5 in.; Agassiz, 6 in.

30th, Father Point, 5 in.

31st, Roseberry, 6 in.; Father Point, 11 in.

Aurora recorded on—

Where the class of aurora is noted by the observer it is given (I), being the brightest (IV), the feeblest in brilliancy.

1st, Winnipeg, IV.

2nd, Gravenhurst, IV.

4th, Clontarf, III.

5th, Winnipeg, IV.

6th, Savanne, Posen, II; Dorchester, St. Albans, IV; Fort Ellice, II; Truro, III; Winnipeg, IV.

7th, Alexandria, III; Kingston, III; Prince Albert, III; Winnipeg, IV.

8th, Egremont, IV; Posen, IV.

9th, Henrietta, Russell, IV; Truro, IV; Esquimalt, IV; Winnipeg, IV.

10th, Savanne, Russell, IV; Winnipeg, IV.

11th, Winnipeg, IV.
12th, Prince Albert, II.
14th, Little Forks, IV.
17th, Cravenhurst, IV ; Little Forks, II.
19th, Chicoutimi, Hillview, Dorchester, (*brilliant*) ; Russell, III ; Fort Ellice, II ; Truro, III ;
Fredericton, III.
20th, Georgetown, P.E.I., Dorchester, Fort Ellice, II ; Truro, III ; Sydney, IV.
21st, Dorchester.
22nd, Dorchester, Minnedosa, II ; Prince Albert, IV.
25th, Winnipeg, IV.
26th, St. Albans, IV.
27th, Little Forks, II.
28th, Russell, IV ; Winnipeg, IV.
29th, Savanne, Russell, IV ; Toronto, IV ; Winnipeg, IV.
30th, Little Forks, II ; Port Arthur, III.
31st, St. Albans, IV.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE
THE HORIZON IN THE MONTH OF DECEMBER, 1891.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMALT.....				0 00	0 06	0 16	0 24	0 23	0 20	0 21	0 16	0 00				
AGASSIZ.....					00	04	15	16	18	13	07	01				
BRANDON.....					08	35	34	38	46	43	33	02				
INDIAN HEAD.....						09	23	25	33	39	15	02				
WINNIPEG.....				02	13	20	16	37	37	34	31	06				
KINGSVILLE.....				00	26	46	50	46	50	55	48	31				
WOODSTOCK.....				09	15	35	40	45	46	41	40	17				
TORONTO.....				06	37	56	37	43	49	49	54	35	02			
LINDSAY.....				01	24	31	32	37	38	39	39	27	30			
PARROT.....				8	17	21	28	40	30	31	32	20				
KINGSTON.....				03	24	44	41	44	44	39	33	21				
.....																
MONTREAL.....				02	24	37	47	52	51	46	34	09				
FREDERICTON.....					22	30	33	34	37	41	37	30				
SYDNEY.....					15	23	29	36	35	29	16	11				
				ESQUIMALT.	AGASSIZ.	BRANDON.	INDIAN HEAD.	WINNIPEG.	KINGSVILLE.	WOODSTOCK.	TORONTO.	LINDSAY.	PARROT.	KINGSTON.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Constant sunshine below 1.)	0 15	0 08	0 27	0 16	0 23	0 40	0 40	0 34	0 36	0 31	0 27	0 30	0 28	0 30	0 22	
MAXIMUM DAILY AMOUNT.....	61	0 00	0 71	0 75	0 81	0 86	0 86	0 86	0 91	0 97	0 89	0 81	0 91	0 81	0 77	
DATE.....	19	24	25	25	16	18	12	12	17	5	13	31	19	20		
NO. OF DAYS COMPLETELY CLOUDED.....	19	21	12	16	11	9	7	9	12	15	9	9	10	8		

Thunder storms recorded in British Columbia at Oquamichan on 7th and 8th and Fort Simpson on 21st.

PROBABILITIES.

The probabilities issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 683. These were divided as follows :—

DISTRICT.	No. ISSUED.	VERIFIED.			Percentage.
		No. Fully.	No. Partly.	No. Not.	
MANTHOBA	108	75	11	22	74.5
LOWER LAKE REGION	120	92	16	12	83.3
UPPER ST. LAWRENCE	114	88	15	11	83.8
LOWER ST. LAWRENCE	116	87	14	15	81.0
GULF.....	114	83	18	13	81.7
MARITIME PROVINCES	111	81	19	11	81.5
TOTAL.....	683	506	93	84	80.9

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at the "Probability Stations," as well as the telegraphic reports, are used.

The daily probabilities were issued by Probability Officer H. V. Payne.

STORM WARNINGS.

During the month warnings on the approach of five storms were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 88, of which 74, or 84.1 per cent., were verified. Ten stations reported warnings received late, owing to delay in issue, and in five cases the velocity exceeded that indicated by the signal.

In conjunction with the warnings, predictions as to the probable directions of the wind were given, and of the 74 warnings verified as to force, 58, or 78.4 per cent., were fully verified as to direction, and 63, or 85.1 per cent., were fully or partly verified.

1. On the morning of the 3rd there was an important developing depression over Iowa and Minnesota ; warning of a heavy north-east veering to north-west gale was sent to Port Arthur ; of a heavy south-east to south-west gale to Sault Ste. Marie and stations on Lake Huron, and of a moderate gale from the same directions on Lake Ontario. The storm, with still increasing energy, moved to Lake Superior, and thence passed away north-east and east. An easterly gale began on Lake Superior early on 3rd, continuing till next morning, and then shifted to the westward. On the other Lakes the gale began late at night on the 3rd from the south-east, and on the 4th shifted to the south-west and west, from which directions the blow was heaviest. At 11.15 a.m. on account of this same storm, the warning was extended to stations in the Bay of Fundy, and during the early morning of the 5th a heavy south-west gale set in, and lasted until afternoon. Presqu'Isle, Ont., reports 1 to 2 a.m., 5th, S.W. 60 to 70 miles ; Collingwood, morning 5th, W. 45 ; Saugeen, 11 p.m., 4th, W. 50 ; Toronto, 1 to 3 a.m., 5th, N.W. 45 ; Kingston, 3 to 5 p.m., 5th, S.W. 38. Signals were lowered at all stations on evening of 5th.

2. A small depression, moving quickly north-eastward, was at 8 p.m. of 6th central in Ohio, and warning of a moderate gale, at first from an easterly direction, was despatched to stations on the Bay of Fundy. Strong winds with rain, were prevalent next evening in the district warned, but there were no gales reported. Signals were lowered during forenoon of the 8th.

3. On the 8th there was an important depression over the North-West Territories and north of the Lake Region, which, with high pressure to southward, gave a steep gradient for south-westerly winds over the Lakes. Warning of a moderate southerly to westerly gale was at 4 p.m. despatched to the Maritime Provinces. During 9th strong winds and moderate gales from the south-west prevailed very generally in the districts warned ; but nowhere was the storm severe. Signals were lowered on evening of the 9th.

4. A depression which caused rain with high winds in the Lake Region on 15th, was on the evening of that day central in eastern Ontario and moving east ; at 4 p.m. warning of a moderate

gale, veering from east to south-west, was despatched to stations on the Bay of Fundy ; a moderate south-easterly gale set in early next morning at most of the stations, which later on in the day, as the storm centre passed across the Gulf, was followed by a fresh westerly gale. Signals were lowered during forenoon of 17th.

5. Owing to an important cyclonic development to the west and south-west of the Lake Region on the evening of the 28th, warning of a moderate south-east to south-west gale was at 10.20 p.m. sent to stations in the Bay of Fundy. The storm moved eastward, and during the night of the 29th, a moderate south-easterly gale began to blow very generally in the Maritime Provinces. By the morning of the 30th the storm centre was near the Massachusetts Coast, whence, with rapidly increasing energy, it passed north-eastward across the Bay of Fundy and Gulf of St. Lawrence. Signals indicating a heavy westerly gale, were ordered for all Maritime stations at 11 a.m. 30th. That same evening a heavy south-east to south-west gale prevailed, both on the Atlantic Coast and in the Gulf, and during the early part of 31st there was a heavy north-westerly gale in the Bay of Fundy. Signals were lowered on evening of the 31st.

TORONTO OBSERVATORY, MAGNETIC REVIEW FOR DECEMBER, 1891.

The first five and a half days were comparatively free from disturbances. About 8 p.m. of the 6th, the magnets became unsteady, the declination magnet moving east until 4 a.m. ; after this hour the disturbance became more important. Previous to 10 a.m. some rapid vibrations of the magnets took place ; shortly after 10 a.m. the magnet moved west, a marked maximum taking place at 11.08 a.m. It then turned east, vibrating considerably, especially shortly after the noon observation. Rapid oscillations were kept up until 9 p.m. of the 7th. The v. f. shews a decrease on the 7th up to 6 a.m. ; it then slowly returned to its normal reading. The h. f. does not shew any marked changes until 11.47 a.m., when a sudden increase of force set in, followed by a larger decrease until noon ; after this hour sharp vibrations commenced, and continued up to the evening hours. Slight irregularities were shewn on the morning and afternoon of the 8th and morning of the 9th ; the afternoon and evening hours were similarly affected. About 9.40 p.m. of the 9th a sudden easterly sweep of 35' of the declination magnet set in, the minimum occurring at 10.03 p.m. ; a return swing immediately followed, and the magnet continued slightly disturbed to 10 a.m. of the 13th. The h. f. shews a marked decrease of force on the 9th, between 10 a.m. and noon. Slight disturbing action again began on the 13th, and was visible up to the night of the 15th.

The following two days were quiet. On the evening of the 18th slight disturbing action appeared, and the movements increased during the afternoon and night hours of the 19th. This disturbance lasted until noon of the 23rd. The curves on the mornings of the 21st and 22nd present an undulatory appearance. There was nothing of importance registered from the 23rd to the night of the 29th at 8.45, when a sudden hitch in the declination curve announced the commencement of a small disturbance. Between 7 and 10 a.m. of the next day the movements increased ; during the afternoon the magnet became very steady, and continued so until the night of the 31st, and the year closed with the magnets in a slightly disturbed condition.

On the 29th auroral light class (IV).— On the 1st, 2nd, 3rd, 5th, 7th, 8th, 10th, 11th, 12th, 16th, 18th, 19th, 20th, 21st, 22nd, 23rd, 25th, 27th, 28th and 30th the sky was clear, but no aurora was observed, on other nights, clouds or haze would have hidden any aurora which might have existed.

CHARLES CARPMAEL,

METEOROLOGICAL OFFICE,

Director.

TORONTO, February 10th, 1892.

P
Astron.
Can.

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